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Gas Journal

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"One Hogshead of Locks, Hinges, and Iron Wares marked N, sent by Capt. Grose £56.15.6." The item has the date April 10th 1720 and is one of many in an old book recording "Benefactions to Harvard College in New England" by Thomas Hollis of London, Merchant. Harvard holds the name Hollis in honour. In 1726 for instance "Mr. Hollis remitted £1170 Currency, i.e. £300 Sterling, and founded a Professorship of Mathematics and Natural Philosophy, salary £80 Currency." Another Thomas Hollis of the same generous family "presented a Sphere, Orrery, and a Box of Microscopes." That was in 1732. We of Bell's have been interested to read the records because Mr. Andrew Thomson of the Phoenix Brass Works, a Rotherham Hollis Trustee, is one of our Directors. A book awaits the writing on Hollis and Harvard. Thomas Hollis the younger on August 21st 1765 noted in his diary the death of Dr. Mayhew of Boston, U.S.A., adding this comment: "Reader, pursue his plan, the good of North America and of mankind : Live, like him, to great ends." The council is exhilarating at the present hour : Live to great ends. We pass the message on to our own personnel at Slough and in Bell's Branches everywhere. Great Britain is under obligation to export which means an eagerness of urgency in the pursuit of efficiency in every part and phase of industry and in all the minutiae. We of Bell's together with W. N. Baines & Co. Ltd. of Rotherham, closely associated with us, are specialists not only in Applied Asbestos but also in transmission belting, valves in bronze and steel for the highest pressures and other engineering equipment designed to enable British machinery and British manufacturing plants to work at a pitch of excellence unsurpassed anywhere.

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Gas Journal

102nd YEAR OF PUBLICATION

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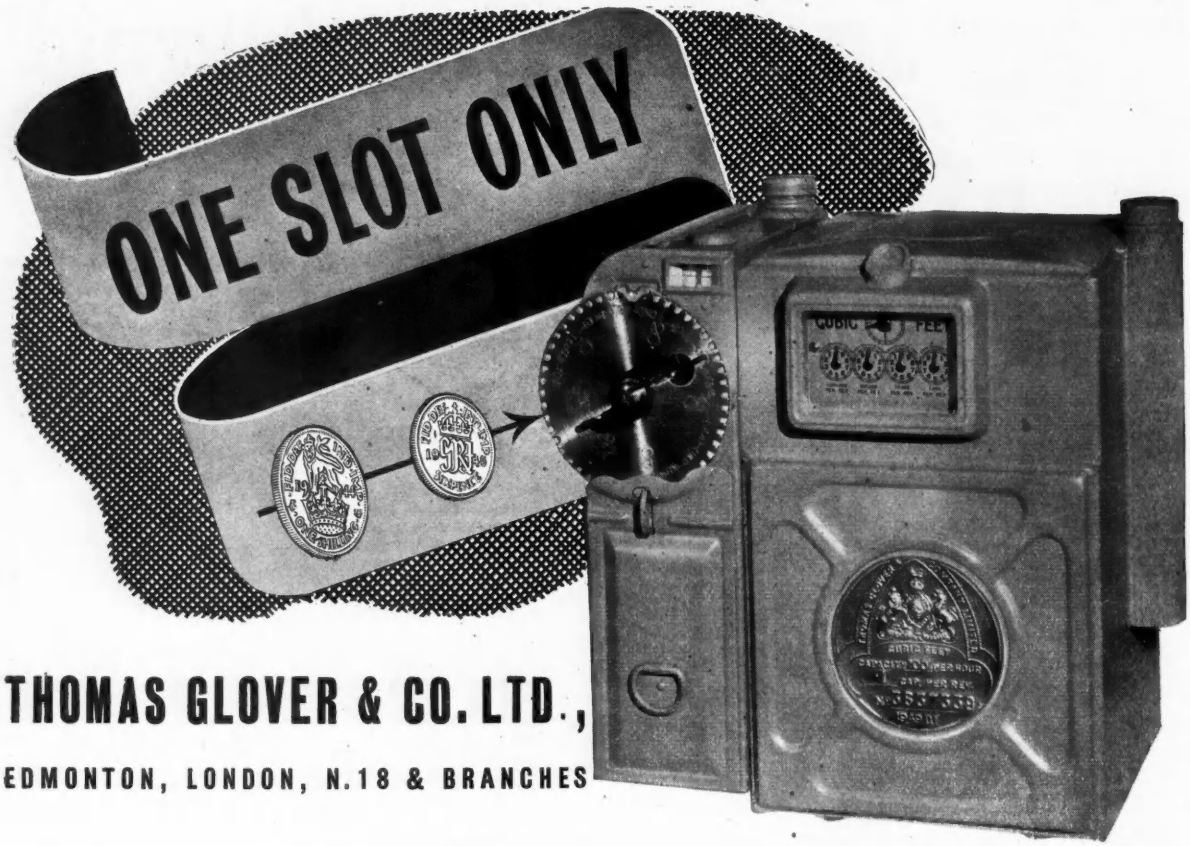

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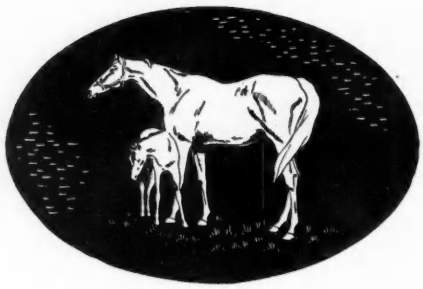

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GAS JOURNAL

VOL. 261. No. 4518 102ND YEAR JANUARY 4, 1950

C.W.G.

AS a result of the war, social changes, and international as well as national economic policies, the prices of coal, oil, plant, and labour have altered fundamentally and probably for a very long time to come. As Dr. H. Hollings remarked so cogently at the research meeting of the Institution of Gas Engineers, points of view which may have been proper and sensible some years ago should be reviewed drastically today. His concern was with research—to determine that those engaged in it had the right objective at the right time. In the past, he remarked, several objectives had been put before them. Sometimes it had been to make less coke, or even to make no coke at all, or to use less oil, or less labour, or less ground space.

The emphasis rightly laid by Dr. Hollings on changed values from which there can be no return to a past 'normal' has a bearing on a paper which we publish substantially in full in to-day's *Journal* by Mr. S. C. Crathorn, of Birmingham, on carburetted water gas. The Birmingham undertaking has made good use of carburetted water gas plant and has made exhaustive study of its manufacture, and Mr. Crathorn's paper has special significance at the present juncture. The author claims that in current circumstances increased use of carburetted water gas plant can be justified on the grounds of cost, control of the coke market, reliability, and flexibility, especially in meeting demands for peak load gas; and he discusses the use of carburetted water gas units as base load plant.

It is a fact that the use of carburetted water gas has increased steadily over the past 20 years and more rapidly than the use of coal gas, though, of course, the amount of coal gas made is very much larger. In 1929 carbonisation plants produced 255,000 mill. cu.ft., the quantity of water gas made being 46,000 mill. cu.ft. Ministry of Fuel and Power statistics for 1947—the latest official figures available—show that the corresponding makes were 323 mill. cu.ft. of coal gas and 84,000 cu.ft. of water gas. In other words, during the 18-year period coal gas production increased by 27%, while water gas production increased by 83%. That is the national picture. As far as Birmingham is concerned carburetted water gas plant is called upon to a much greater extent than pre-war in order to meet output. The requirement of a normal winter week has risen from a maximum of 37 mill. cu.ft. out of a possible 100 mill. cu.ft. per week to a maximum expected to be 90 mill. cu.ft. out of a possible 157 mill. cu.ft. In 1935-36 the peak use of carburetted water gas amounted to 65 mill. cu.ft. per week, while this winter the peak use may be as much as 150 mill. cu.ft. per week.

In his paper Mr. Crathorn discusses in a most interesting way modifications in operation and design of carburetted water gas plant; he also discusses the all-important matter of cost of production of carburetted water gas. We give some of his figures here. An increase of 2d. per gal. in the price of gas oil is equivalent to an increase of ¼d. per therm in the cost of production. A decrease of 5s. in the price of coke means approximately ¼d. decrease in the cost of carburetted water gas production per therm, but an increase of 0.4d. per therm in the production cost of coal gas. And in considering the installation of new plant today capital charges are of major importance. The author evaluates that capital charges based on installations of 9 mill. cu.ft. per day capacity, including ancillary plant, are approximately 2½d. per therm for coal gas and 1d. for carburetted water gas plant. And, says Mr. Crathorn, 'although production costs of carburetted water gas are at present approximately ¼d. per therm dearer than those for coal gas, if capital charges are included at present-day rates, carburetted water gas becomes the cheaper by approximately ½d. per therm.' Again, the fact that capital charges for carburetted water gas plant are considerably less than those for coal gas plant makes attractive the prospect of using carburetted water gas units as base load plant.

The paper which we have been discussing was presented to the Midland Junior Gas Association, and is an example of the excellent technical contributions which are being made to the proceedings of the junior organisations.

GAZ DE FRANCE

OUR feature article 'Gas in France,' has pointed out that gas prices are rigidly controlled by French Government decree and that these prices are lower than what is necessary to meet with the costs of manufacture and distribution. In the current number of *Chaleur et Industrie*, the Editor, our well-known and highly respected colleague, M. Henry Cassan, makes what he calls 'An Appeal.' He cites a quotation from a recent pronouncement by M. G. Combet, Director-General of Gaz de France.

M. Combet said: 'There is reason to regret that they deliberately maintain a deficit in the public utility Gaz de France. How is one to justify the allocation of public money in the equipment of an enterprise which appears incapable of balancing its accounts, when *they* hardly dare reveal the extent of its deficit? Already the sanction of loans is granted in a niggardly fashion and they never miss the opportunity of calling attention to the impecunious condition of the industry. A brake is thus put upon the modernisation of its plant and at the same time on the development of its sales and the improvement of its selling prices. Are they going to fall into the same error with regard to gas as they have done in their housing policy, which everyone agrees in deploring? Systematically depreciating gas as they have depreciated the construction of houses, they tend to condemn the gas industry to the same stagnation as they have discouraged the building of dwellings to let. Thus is prepared inevitably a crisis in the gas industry as pernicious as that in the building trade; a crisis which will be accompanied by an untold waste of power.'

M. Cassan remarks that the State, which has nationalised large sectors of industry, has shown itself incapable not only of managing them but, quite simply, of letting them live. We need not follow him into the realm of political controversy which is no concern of ours, but these experiences of our neighbours must incline us to ask ourselves whether the present tendency in our own country to curtail expenditure on long overdue developments and extensions of gasworks plant is not more than is justified by the nation's economic debility as indicated by the devaluation of sterling—the excuse for these ill-judged cuts. If there is one industry more than another where capital expenditure at this juncture will be amply repaid in national economy—in the saving of coal—it is in the gas industry.

FURNACE DESIGN AND PRACTICE

PROFESSOR R. J. SARJANT'S paper presented to the Institution of Mechanical Engineers last month is commended to the study of the higher ranks of industrial gas engineers. The computation of heat transmission is always a complicated business involving in some cases the invocation of the calculating machine. It is the section on mechanisation and instrumentation which will be of particular interest in our own industry.

Professor Sarjant's brief remarks on producer control confirm and emphasise what has now become of considerable importance in the retort house where the mechanical producer is becoming a feature common to many modern installations. It is suggested that control should be directed to three points, the pressure of the gas in the offtake main controlling through a servo-mechanism the steam valve of steam-injected air supply or the air valve in the case of fan-driven blast, blast saturation control from measurement of blast temperature (or, as we say, that of the steam-air mixture), and recording of the gas offtake temperature which, taken in conjunction with measurement of fuel and ash bed levels, is a useful indication of fuel-bed conditions. Control by way of steam-air temperature is complicated by wetness of the steam in the blast, water droplets being filtered out in the ash bed, and probably in practice it will resolve itself into observing the temperature which under the actual conditions gives the optimum result, operating the steam supply to keep that temperature constant. Professor Sarjant remarked that better results can be obtained with the use of mechanical blowers and independent steam supply (using, for instance, exhaust steam) but that the facts suggest that there is still a problem to be solved in blast admission and distribution.

The design and selection of instrumentation whether in the retort house or in the industrial user's workshop require wisdom as well as ingenuity. Over-elaboration may result in confusion and futility. Instruments are usually delicate pieces of mechanism. Dust, heat, wear and tear have their inevitable effect, and effective performance will only be secured by adequate and intelligent maintenance. An instrument which is out of commission is worse than no instrument at all.

The paper concluded with a concise but inevitably condensed section on the mechanisation of the charge in the furnace—illustrated by sketches of several types of furnace and conveyor. The latter have been rendered practicable by the development of heat-resisting alloys. It is to be particularly noted that nickel is an essential element in most of these and that sulphur in the atmosphere is particularly troublesome where nickel is employed. This is just another indication that the elimination of sulphur from town gas would remove a formidable hindrance to its conquest of the industrial market. Reading Mr. J. E. Stanier's report of the former Stoke-on-Trent Corporation Gas Department for the year ended March 31, 1949, we were struck in the first place by the enormous consumption of town gas in the pottery industry but struck still more by the fact that even here the electric furnace, absurd though it may seem, still finds a market—and a market, one would think, which it would not be able to hold if the town gas supply were sulphur-free.

SULPHATE OF AMMONIA

ALL but a very small percentage of Britain's output of sulphate of ammonia is produced by the gas and coking industries, and the report of the British Sulphate of Ammonia Federation for the year ended last June comes as an annual reminder of the vital link that exists between those industries and agriculture. There are some remarkable figures in the report. Production in the United Kingdom in 1948-49 reached a total of 901,000 tons, showing a substantial increase on the two preceding years and nearly 420,000 tons more than in

the last pre-war year. On the other hand, home agricultural consumption at 593,779 tons showed a decrease of a little over 39,000 tons compared with the previous year, due mainly to the fact that some 300,000 acres which should have been sown with cereals were left under or put back to grass and the total increase in grassland was 420,000 acres. The mild winter was also a factor in reducing the demand for direct application as autumn sown crops were so forward and vigorous in the early part of the year that few farmers considered it advisable to use sulphate of ammonia for top dressing. The excessively dry period which followed was a further discouragement. The reduction in demand for direct agricultural application was, however, offset by a further increase in the demand from compounders, who again exceeded the previous year's record figure of production.

Sulphate of ammonia propaganda has been carried on now for 52 years by the Federation, its predecessors, and its associates, and while no change took place during the year in the methods of propaganda or the media employed, steadily increasing emphasis was placed on the use of fertilisers on grassland. The effectiveness of this work was revealed in a remarkable increase in official statements at agricultural conferences and meetings on the value of nitrogen; this point is also being emphasised by members of the official field advisory service who are recommending more liberal use of nitrogen. Two instructional films were made during the year on 'Dried Grass' and 'Fertilisers for Arable Crops.'

Although still substantially short of the first post-war year (1945-46) exports of sulphate of ammonia from the United Kingdom totalling 243,972 tons in 1948-49 were some 3,374 tons higher than in the previous year. As usual the largest individual consignments went to India, Pakistan, Burma, and Ceylon, although in each case the total was below the previous year's figures. Exports to Malaya and British Borneo jumped from 3,209 tons to 13,653 tons, compared with a record total of 32,479 shown by the United Kingdom Customs Returns for 1937-38.

A PEAK-LOAD COMBINATION

THE domestic space heating load is posing an economic problem for many gas undertakings in the United States of America. The difficulty, of course, is the peak load. Severe cold spells can tax production and storage capacities of even the largest systems. Peak load problems are not new to the gas industry and over many years many types of standby facilities have been adopted to meet them. We learn of a new type of equipment designed to solve the difficulty. This consists of a single heating unit designed to burn both gas and oil, and it is described in the December issue of the *Canadian Gas Journal*. Operation is entirely automatic. An outside thermostat automatically switches over from gas to oil when the weather becomes severely cold and switches back again to gas when the weather moderates. In most areas, it is stated, the thermostat is set to change from gas to oil at 20°F.; and since there is a slight lag in the outdoor control the switch back to gas is automatically effected when the outdoor temperature reaches 25°F. On an annual basis the average consumer will use 15% to 20% of oil and 80% to 85% of gas in the heating season. A basement or outdoor tank of 275 gal. capacity is sufficient to carry the average home through a normal winter with one filling, which can be carried out in the summer when oil prices are low. The combination of the two fuels affords full protection against failure of heat in the home.

GAS IN THE POTTERIES

WE have already mentioned *en passant* the increase in the use of gas in the Potteries. The report of Mr. J. E. Stanier on the working of the former Stoke-on-Trent Gas Department for the year ended March 31, 1949, tells a remarkable tale of development. Applications for town gas have been received which will account for the gas to be produced by the new extension of an 8 mill. cu.ft. a day plant scheduled for completion by 1953. During the 12 months under review industrial consumption jumped by 609 mill. cu.ft., an increase of 20%. Sales of 3,661 mill. cu.ft. for industry represent 60% of the total sales of the undertaking. Gas consumption for the ceramic industry has risen since 1939 to the remarkable figure of 3,108 mill. cu.ft. a year—an increase of 138%. These impressive figures indicate the valuable contribution which the undertaking has made to improved methods of gas firing in the ceramic industry since the first practical application of town gas in 1932. From that time until some three or four years ago the installation of tunnel kilns proceeded at a steady rate. More recently there has been a phenomenal increase in the pace of kiln building and in the demand for gas for their operation. The demand for gas is now such that its satisfaction is entirely dependent on the speed at which new gas manufacturing and ancillary plant can be installed. The number of town gas fired tunnel kilns in operation at March 31, 1949, was 130, and there were 20 intermittent kilns. The corresponding figure for 1939 was 66. Mr. Stanier is now manager of the North Staffordshire Division of the West Midlands Gas Board. His last report as chief engineer and general manager of a municipal gas undertaking—at the time of nationalisation the third largest municipally-owned gas undertaking in England—is of far more than local interest. It is a pointer to the future.

LOOKING TO THE FUTURE

So that Members of Parliament, local authorities, trade and other organisations, as well as members of the Gas Consultative Council, may have accurate information as to the gas industry in the area, the North Thames Gas Board has issued a 48 pp. brochure, with a large coloured map as folding plate, describing the board's administrative, technical, and commercial organisation, the build-up of the undertakings, and the ancillary services, and indicating briefly the tasks that lie ahead. At one time nearly 60 separate undertakings catered for the gas requirements of the area, but amalgamations had by 1932 reduced the number to 12, and these 12 became the constituent undertakings of the North Thames Board on May 1, 1949. The Gas Light and Coke Company was already more or less a regional undertaking in itself, selling 273,275,500 therms to 1,436,500 consumers in the last recorded year of private enterprise. The other 11 undertakings, including the important Commercial, Uxbridge, &c., Lea Bridge, Romford, and North Middlesex companies, added 56,366,000 therms and 313,000 consumers, to bring the totals to just under 330 mill. therms and 1,749,000 consumers. Six photographs (excluding a pictorial presentation of some of the gas making and distributing processes) and six diagrams serve to illustrate the variety of works and the set-up of the staffs and departments, one particularly interesting picture being a cross-section of New Bridge Street, showing the different underground services. Steps have already been taken to weld the 12 undertakings together, but major constructional projects lie ahead, such as the further development of the most suitably placed works and the extension of the grid. Commercial policy will also require alignment throughout the area, with revision of tariffs to secure greater uniformity. Opportunities will arise for advancement of those already in the industry as well as for new entrants, and pupilships and schemes for continued education are in existence and will be encouraged by the board. 'Meanwhile,' concludes the brochure, 'the board has faced the immediate problem with this always in mind—that change for the sake of change brings no advantage; change arising from the development of ideas means progress.'

Personal

Mr. **J. F. Scott,** Technical Assistant at Leven gasworks, has been appointed to the technical staff at Aberdeen.

Mr. **A. S. Fairn,** M.I.C.E., M.I.STRUCT.E., who is well-known in civil engineering contracting circles, has recently joined the board of Robert M. Douglas (Contractors), Ltd., Birmingham.

Mr. **Jas. S. Christie,** Secretary to the Company, has been appointed to the Board of Horseley Bridge and Thomas Piggott, Ltd., constructional engineers, Tipton, Staffs.

Mr. **Leslie Hardern,** Public Relations Officer of the North Thames Gas Board, has been elected to the P.E.P. (Political and Economic Planning) Club Committee.

Mr. **R. S. Falkner,** Manager of of the Chesham District of the Watford Division of the Eastern Gas Board, has been appointed Sales and Service Manager of the board's Ipswich Division.

Mr. **Harry Bellamy,** who has been for 50 years an employee of the Nottingham gas undertaking, and is now chief maintenance attendant for the Nottingham area, has been presented with an inscribed chiming clock.

Mr. **Eric V. Quickenden,** O.B.E., Superintendent of the East Midlands Gas Board Nottingham showroom, has been appointed to be Sales Superintendent of the Western Division of the Southern Gas Board at Bournemouth.

Mr. **John N. Donnachie,** Manager of Leslie (Fife) gasworks, in place of Mr. **W. Stevenson,** who has retired, has begun his duties. He received his early training at St Andrews, and was Manager for 2½ years at Newburgh. He saw service with the R.A.F. during the war.

Mr. **Andrew Blackhall** has been appointed by the board of Alder & Mackay, Ltd., Edinburgh, to be Area Sales Manager, North Western, Northern, North Eastern, East Midlands, West Midlands and Wales Areas. Mr. **W. P. Rae** has been appointed Area Sales Manager for Scotland. Both appointments have effect from January 1.

Mr. **W. Burnstone,** previously Senior Assistant Solicitor to Derby County Borough Council, has been appointed Chief Assistant Solicitor on the Headquarters Staff of the East Midlands Gas Board. Mr. **J. B. Leaman,** previously Assistant Divisional Marketing Officer of the National Coal Board (East Midlands Division), and Mr. **A. T. Raby,** previously Education and Training Officer, Courtaulds, Ltd., Coventry, have also been appointed by the board as Coke Marketing Officer and Education and Welfare Officer, respectively.

Mr. **D. I. Rowlands,** Sales and Distribution Manager of the Rhymney and Aber, Quaker's Yard, and Merthyr Vale undertakings, has been appointed by the Wales Gas Board as General Manager of those undertakings in succession to Mr. Barton Grainer, whose retirement was announced last week. Mr. Rowlands entered the gas industry in July, 1925, at Abertillery and has been on the staff of the Rhymney and Aber group since 1939. He was Chairman of the Gas Salesmen's Circle at the age of 21 and was President of the Wales and Monmouthshire Junior Gas Association in 1947-48. Mr. **E. F. Long,** formerly Assistant Secretary and Accountant of the same group, has now been appointed Secretary.

Mr. **F. B. Richards,** M.I.C.E., has resigned his position as Chairman and retired from the Board of the Woodall-Duckham Vertical Retort and Oven Construction Company (1920), Ltd., the operating company of the Woodall-Duckham Group, as from December 31. This step is in accordance with the company's retirement policy. He retains the Chairmanship of Woodall-Duckham, Ltd., the holding company of the Group.

Mr. Richards has been associated with the Woodall-Duckham Company since its earliest days and has played a leading part in the company's development into its present position as builders of carbonising plant for the gas and coking industries. He joined the staff of the company at its inception, became a Director in 1923, then Joint Managing Director and, finally, Chairman in 1932, following the death of Sir Arthur Duckham. Mr. Richards is a past Chairman of Council of the Society of British Gas Industries and a past Member of Council of the Institution of Gas Engineers. He has travelled extensively on behalf of the company, having been twice in America and once in South Africa since 1945. At present, accompanied by his wife, Mr. Richards is in Australia visiting the associated company, Woodall-Duckham (Australasia) Pty., Ltd.

Mr. F. B. Richards.

Mr. T. C. Finlayson.

Mr. **T. C. Finlayson,** M.SC., formerly Deputy Chairman, has been appointed Chairman of the Woodall-Duckham Vertical Retort and Oven Construction Company (1920), Ltd., and Deputy Chairman of Woodall-Duckham, Ltd. Mr. Finlayson was educated at Manchester Grammar School and obtained an Honours Degree in Metallurgy at Manchester University. During the first world war he was employed by the Department of Explosives Supply, Ministry of Munitions, at various factories on the control of process efficiency by statistical methods. In 1921 he joined the research staff of the Woodall-Duckham Company to carry out an investigation at Manchester University into methods of producing cheap oxygen for gas manufacture, which work formed the subject of the first Transaction of the Institution of Chemical Engineers and for which Mr. Finlayson was awarded the M.Sc. Degree. He was appointed to the London staff of the Woodall-Duckham Company in 1923 and for the next 18 years was a member of the design and development department, being responsible for the co-ordination of the company's design practice. He was appointed a Director in 1941, Technical Director (in succession to Sir Ernest Smith) in 1943, and Deputy Chairman in 1948. Mr. Finlayson was awarded the M.Sc. degree. He was Gas Engineers and of the Gas Research Board. He has been associated with the work of the British Coke Research Association since its inception through membership of various panels. He has presented a number of papers to various technical Institutions, and he is a holder both of the Institution of Gas Engineers' Gold Medal and the H. E. Jones London Medal. He is a member of the Institution of Chemical Engineers and the Iron and Steel Institute, and a Fellow of the Institute of Fuel.

NEW YEAR HONOURS

The New Year Honours announced on Monday included the following distinctions of interest to the gas industry:

C.B.—Mr. **R. Kelf-Cohen,** Under Secretary, Ministry of Fuel and Power.

C.B.E.—Mr. **Henry Lesser,** O.B.E., LL.B., Industrial Relations Adviser, South Eastern Gas Board, and Chairman, London Executive Council, National Health Service.

O.B.E.—Mr. **S. E. Whitehead,** M.I.C.E., M I.MECH.E., J.P., Deputy Chairman, Southern Gas Board.

M.B.E.—Mr. **Norman Hudson,** Chief Commercial Officer, North Eastern Gas Board, and Mr. **A. Ifan Jones,** J.P., Chairman of the Anglesey Group, Wales Gas Board.

B.E.M.—**A. E. Breeze,** Manager, Hay-on-Wye undertaking, Wales Gas Board; **E. E. Carter,** coal foreman, South Eastern Gas Board, Wimbledon; **J. W. Collinson,** senior inspector, Grimsby undertaking, East Midlands Gas Board; **J. S. E. Marsh,** mantle maintenance man, North Thames Gas Board, Fulham; and **A. Plows,** gas fitter, North Eastern Gas Board, York.

North Western Appointments

The North Western Gas Board has now appointed General Managers of the remaining 10 of the 17 groups of undertakings into which the 103 gas undertakings under the jurisdiction of the board have been divided for administrative purposes. General Managers were appointed to the first seven groups in October, as reported in the *Journal* of October 12 (p. 103). The appointments now announced are as follows:—

Mr. **John Grayston,** G.M., B.SC., M.INST.GAS E., Engineer, General Manager and Clerk of the Stretford undertaking, to be General Manager of the **North Cheshire Group,** comprising the undertakings of North Cheshire, Mossley, Ashton, Stalybridge, Hollingsworth Glossop, Stockport, Marple, Bollington, Macclesfield, and Broadbottom,

Mr. **J. Castle,** B.SC., M.INST.GAS E., Engineer and General Manager of the Leyland and Ormskirk undertakings, to be General Manager of the **Wirral Group,** comprising the undertakings at Chester, Ellesmere Port, Birkenhead, Wallasey, and Hoylake.

Mr. **C. H. Bamber,** B.SC., M.INST.GAS E., Engineer and Manager of the Rochdale undertaking, to be General Manager of the **Oldham-Rochdale Group,** comprising the undertakings of Rochdale, Oldham, Heywood, Middleton, and Littlebrough.

Mr. **T. Haworth,** M.INST.GAS E., M.INST.CHEM. E., F.C.S., Engineer and Manager of the Wigan undertaking, to be General Manager of the **Bolton-Radcliffe Group,** comprising the undertakings of Bolton, Radcliffe and Farnworth, Westhoughton, Atherton, Tyldesley, Worsley, and Leigh.

Mr. **J. G. O. Drake,** F.A.C.C.A., A.C.I.S., Sales Manager and Deputy Secretary of the Liverpool undertaking, to be General Manager of the **Fylde Group,** comprising the undertakings of Blackpool, St. Annes, Kirkham, Poulton, Thornton-Cleveleys, and Fleetwood.

Mr. **A. H. Nicholson,** A.M.INST.GAS E., Engineer and Manager of the Colne undertaking, to be General Manager of the **Blackburn-Accrington Group,** comprising the undertakings of Blackburn, Accrington, Darwen, Oswaldtwistle, Clitheroe, and Withnell.

Mr. **H. D. Robinson,** M.INST.GAS E., Engineer and Manager of the Burnley undertaking, to be General Manager of the **Blackburn-Colne Group,** comprising the undertakings of Burnley, Nelson, Colne, Padiham, Barnoldswick, and Earby.

Mr. **W. B. Harrison,** M.INST.GAS E., A.M.INST.MECH. E., Engineer and Manager of the Middleton undertaking, to be General Manager of the **Bury-Rossendale Group,** comprising the undertakings of Bury, Ramsbottom, Haslingden, and Rossendale.

Mr. **W. Oldham,** M.INST.GAS E., Engineer and Manager of the Fleetwood undertaking, to be General Manager of the **Furness Group,** comprising the undertakings of Barrow, Dalton, Ulverston, and Millom.

Mr. **T. Crowdy,** M.I.MECH. E., M.INST.GAS E., F.INST. F., Engineer and Manager of the Kendal undertaking, to be General Manager of the **Kendal Group,** comprising the undertakings of Kendal, Ambleside, Grange, Milnthorpe, Windermere, and Sedbergh.

In connection with these appointments the following engineers and managers have been appointed whole-time consultants to the General Managers of the groups in which their undertakings are located:—

Mr. **J. D. Ashworth,** M.INST.GAS E., M.INST.MECH. E. (Blackburn); Mr. **T. Reynolds,** M.INST.GAS E. (Stockport); Mr. **T. R. Cook,** M.INST.GAS. E., M.INST. F. (Blackpool); Mr. **J. Hood,** M.B.E., M.INST.GAS E. A.M.I.MECH. E. (Birkenhead); Mr. **H. Platt,** M.INST.GAS E., M.INST.STRUCT. E. (Bolton).

Obituary

Mr. **S. C. Metzgar,** Director and London Manager of Gibbons Brothers, Ltd., Gas Engineers, Dibdale Works, Dudley, died on December 16, aged 65. Mr. Metzgar entered the service of Gibbons Brothers in 1903. In 1927 he became Manager of their London office, and was appointed a Director in 1938.

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Mr. **A. H. Andrews** died suddenly on December 18, only seven weeks after his retirement from the position of Controller of the Metropolitan Division of the South Eastern Gas Board. Mr. Andrews joined the South Metropolitan Gas Company 35 years ago as Superintendent of the stove and fittings shops and six years later was appointed Engineer of the Vauxhall works. In 1927 he became Engineer of the Company's largest works at East Greenwich. He was Joint Manager of the South Metropolitan Gas Company from 1933 until 1937, and Chief Engineer and Works Manager until vesting date, when he was appointed Controller of the Metropolitan Division. Mr. Andrews took a keen interest in the social activities of the Metropolitan Division.

Diary

Jan. 5.—London and Counties Coke Sales Circle : 'The Manufacture and Characteristics of Gasworks Cokes,' H. S. Hughes (North Thames Gas Board). Gas Industry House, 2.30 p.m.

Jan. 9.—Women's Gas Council : Executive Meeting. Gas Industry House. 2.30 p.m.

Jan. 10.—Midland Junior Gas Association : 'Benzole Recovery by Activated Carbon,' H. L. Fielder (Worcester).

Jan. 11.—Wales and Monmouthshire Junior Gas Association : Whole-day Meeting, Port Talbot. Paper by R. H. Hanford (Port Talbot). Afternoon tour of Abbey Works, Steel Co. of Wales.

Jan. 11.—Western Junior Gas Association : Visit to Gloucester gasworks. 'Distribution Problems and Developments at Stroud,' F. W. Nichols. Showrooms, Gloucester.

Jan. 13.—Scottish Junior Gas Association (Western District) : 'Pressure Holder Installations,' A. Austin and A. Johnson (Whessoe, Ltd.).

Jan. 13.—London and Southern Junior Gas Association : 'District Problems,' A. E. Taylor (West Surrey Division, South Eastern Gas Board).

Jan. 16.—Eastern Gas Consultative Council : Meeting, Gas Industry House.

100 YEARS AGO

Long Division

That greater animation and initiative were exhibited in meetings a century ago there is no doubt. Take, for example, the Court of Common Council held in the Council-chamber, Guildhall, and reported in the *Journal* for January 10, 1850, when a petition was presented from the Great Central Gas Company (then the source of much fruity and fruitful copy) for leave to supply the Mansion House, Guildhall, and other public establishments with gas upon the same terms as with private consumers to enable the company to ascertain probable

Line Drawing by G. W. Battison.

consumption and adapt their works accordingly. The ensuing discussion was lively and (almost) libellous. One gentleman moved the adjournment of the question as the court was exhausted, but after a division it was decided to continue. Shortly afterwards the motion for adjournment was repeated. To cries of 'Oh, oh,' a Mr. H. L. Taylor said he would divide the court 20 times rather than the question be settled that day (great confusion). After a further division, discussion was again resumed, but the opponents of the motion manifesting an evident determination to divide the court *ad infinitum*. Increasing confusion followed, and after five hours it was found that almost all had departed. The court was adjourned.

Gas Council's Coat of Arms

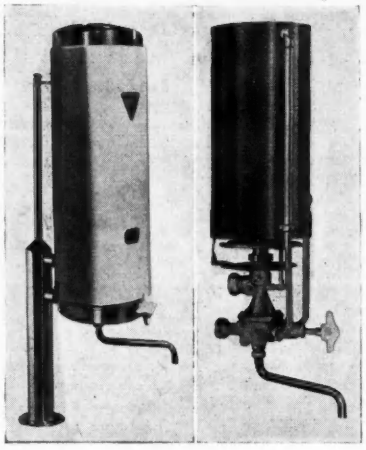
The coal from which gas is derived, and the flame which gas gives, are represented symbolically in the Coat of Arms designed for the Gas Council by the College of Arms and now approved. The motto chosen by the Council is *In Libertate Consilium* (Freedom in Council).

The shield on the coat of arms has a black background to symbolise coal and the earth from which it comes, and flames coming out of the background represent gas. In the border of the shield are twelve red annulets to represent the 12 area boards, the ring being an emblem of unity and each board being a unit on its own. The supporters are two owls, emblems of Minerva, the Goddess of Counsel. In the crest is a dragon holding a torch to signify the Council's interest in education and research.

In the Last Year before the undertaking became State controlled, Walsall Gas Department showed a loss of £14,090, compared with a profit of £11,893 in the previous year. The accounts show that during April, immemediately preceding vesting day, there was a profit of £1,992.

A New Ascot Sink Water Heater

The development laboratories of Ascot Gas Water Heaters, Ltd., at Neasden, and associated research laboratories in Surrey, have been engaged in work to improve the design and efficiency of gas water heaters, and this work continues as a major item of the policy of the firm. In the *Journal* of November 30 we gave an illustrated description of the Ascot balanced flue multipoint heater. We now describe a new instantaneous sink water heater (Type 503) which we inspected a few days ago and which is now on sale to the public. Fundamentally the new heater is similar to the R12/4 sink heater, but it incorporates detail improvements and is totally enclosed—the while it is more readily accessible and easier to service. From our illustration it will be seen that a new design of outer shell has been introduced.



Technical improvements have been directed to making the heater sturdier and easier to maintain. The method of construction of the body—the welding of the inner and outer shells, and the design of the joints—has resulted in marked improvement of heat transfer and mechanical strength, prolonging the average life of the body and substantially increasing the water pressure which the body is capable of withstanding. One-tap control renders the heater simpler to operate, giving warm to hot water as the tap is turned; and the reinforced rubber diaphragm of the automatic valve ensures long life. The cold water inlet and hot water outlet body bends and connections are of larger bore, which fact naturally reduces the possibility of complete blockage by scale. Improved burner connections facilitate maintenance and reduce risk of damage to burner tube and pilot assembly.

Technical details are as follows:—

Output: 500 B.Th.U./min. (1.25 gal./min. raised through 40°F., 0.83 gal./min. raised through 60°F., 0.5 gal./min. raised through 100°F.).

Input: 625 B.Th.U./min. (1.25 cu.ft./min. of 500 c.v. gas).

Pilot Rate: 0.5 cu.ft./hr.

Dimensions: Height, 2 ft. 0½ in.; width, 6½ in.; depth, 6½ in. (without tap), 8¼ in. with tap.

Scottish Foundries are now producing some 50% of the household fuel appliances manufactured in Britain, according to a recent statement by Sir Patrick Dollan, Chairman of the Scottish Fuel and Power Efficiency Committee. They have at least 10 years' work ahead on stoves, grates, and fuel saving appliances generally.

A Fall in Output of coal was recorded last week, total production at 4,301,600 tons being 488,000 tons less than in the previous week when a record post-war output was achieved. With the results of three working days to come the miners are now certain to achieve the minimum target of 202 mill. tons, but they are not likely to exceed it by very much. Manpower for the week ended December 17 showed a decline of 200 to 709,000, including the loss of 100 face workers. Gas available at gasworks last week totalled 12,355.7 mill. cu.ft., an increase of 24.7 mill. cu.ft. over the previous week, and 1,099.7 mill. units of electricity were sent out, against 1,110.8 mill. over the same period.

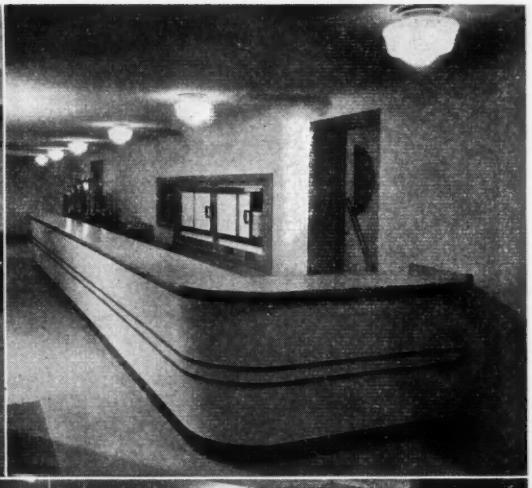
100,000 GRILLER HOTPLATES

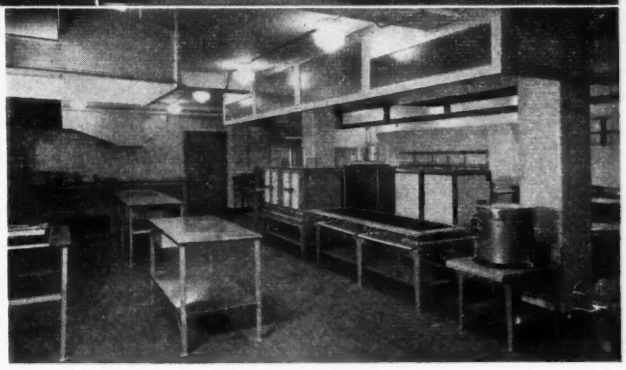
As soon as possible after the war, John Harper & Co., Ltd., Willenhall, commenced the change-over to the production of their domestic gas appliances. One of the first of these was an attractive new design on modern lines of a griller hotplate (No. 3177), a most useful combination for the smaller household or flat.

Our illustration shows the actual testing and final adjustment in the Harper Works of the 100,000th hotplate to be made of the model since its post-war introduction. This is an excellent production effort, especially as the hotplate griller comprises no fewer than 31 components. All these, except taps, tube adaptors, piping, and screws have been made throughout in Harper's own works.

The basic castings for the appliance are produced in the Harper iron foundries. The vitreous enamelling, in an attractive pearl-grey mottle with black vitreous enamelled burners and top grid, is also carried out in the Harper finishing shops, as also is all machining and assembly.

SOUTH EASTERN GAS BOARD'S NEW STAFF RESTAURANT





Our photographs are of the new staff restaurant at the South Eastern Gas Board's headquarters at Katharine Street, Croydon. By careful planning, particularly in the lighting and decorative schemes, natural difficulties of converting a basement were overcome and the result is an attractive restaurant and an efficient kitchen equipped to serve 500 meals a day.

The method adopted to overcome the absence of natural ventilation is of interest because it was partly determined by the existing building and air conditioning plant. Conditioned air is introduced into the main dining room through diffusers in the ceiling, extracted through grilles in the doors via the kitchen and discharged into the open some distance from the building. This process keeps the kitchen cool and prevents the smell of cooking from reaching the upper floors of the building.

A logical sequence of cooking operations is permitted by the lay out of the equipment, and tiled floors and walls with covered skirting and rounded corners reduce the labour of cleaning. 'Vermiculite' plaster ceilings in both restaurant and kitchen together with air extraction plant prevent any of the usual condensation troubles. Meals are served from the kitchen through a hot closet which is raised to prevent unnecessary stooping by the kitchen staff.

Furnishing generally is in light oak, the table tops and counter being covered with buff and pink formica, a fire-resisting and easily cleaned plastic material. The colour scheme of the restaurant is cream sprayed walls and ceiling with dark red skirting and bands in the buff coloured floor.

The following appliances are installed: Four elevated 'Chester' double oven gas ranges; ovens fitted with Regulo controls. No. 23 'Wardour' fish fryer, complete with back and side screen. No. 757 'Chester' boiling table. Double No. 4158 compartment vegetable and pudding steamer. Two 'Lune' vegetable boilers, 20 gal. capacity. No. 30/2 'Confector' pastry oven. 'Belgravia Minor' hotcloset, and a 'Holborn' bain marie. No. 27 'C' pattern 'Savoy' grilier. Maxol tea and coffee set, No. BD. 2.

Jubilee Presentations

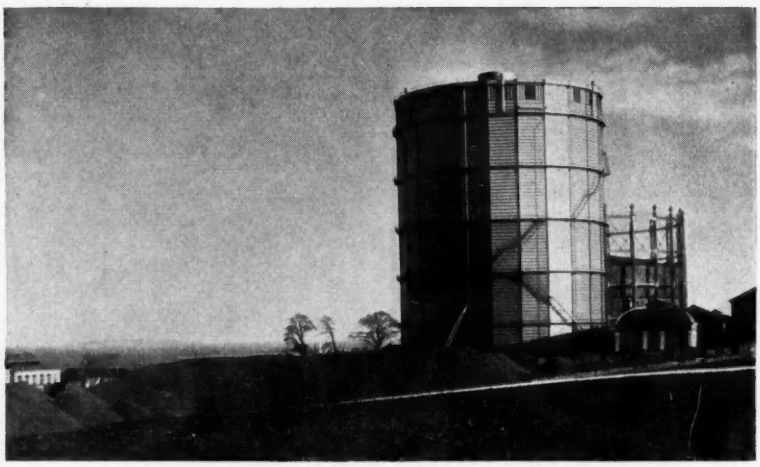
To celebrate the golden jubilee of the formation of C. and W. Walker, Ltd., Midland Iron Works, Donnington, as a limited company, the Directors invited 136 employees with 25 years' service and over, together with their wives, to dinner on December 16. Mr. S. M. Milbourne, Chairman and Managing Director, presided. Mr. Milbourne himself has completed 34 years' service with the Company and is carrying on a family tradition, for his father, Mr. R. J. Milbourne, was Chairman and Managing Director, with 65 years' service to his credit, and is still an active member of the board of directors.

During the evening the Chairman presented barometers and tankards, suitably inscribed, to a number of employees who had completed 50 years' service.

Mr. S. M. Milbourne, Chairman and Managing Director, handing a barometer to Mr. Tom Lowe, who has served the firm for 57 years.

'Toning' a Gasholder

THE recent painting of the waterless gasholder at Granton has attracted considerable attention in Edinburgh, and this account of the paint used will be of more than passing interest. The holder, which has a capacity of 5 mill. cu.ft., is 176 ft. in diameter and 261 ft. in height from ground level to the top of the crown ventilator. The painting of such a prominent structure necessitated the use of a paint which would be as inconspicuous as possible and which, at the same time, would provide the maximum protection to the steel.



The original proposal was to remove the old paint by thorough scraping and wire-brushing before applying the following three coats of paint which, from past experience, have proved extremely satisfactory: 1st coat, red lead graphite primer; 2nd coat, natural silica graphite undercoat; 3rd coat, silica graphite battleship grey to shade No. 32, B.S.S. No. 381C-1944. The local town planning officer objected to the colour of battleship grey on the grounds that the gasholder would be very conspicuous and would not tone in with the general surroundings. As an alternative, he proposed a shade of bright golden yellow which the Edinburgh undertaking of the Scottish Gas Board considered unsuitable in that the gasholder would be more conspicuous than ever and that it would be difficult to obtain a paint which would retain that shade over a period of years and at the same time give the required protection to the steel.

As a compromise it was agreed that three shades of sky or sea blue would be adopted, and the actual shades were chosen by the Royal Fine Art Commission for Scotland. The problem now was to obtain paint to the chosen shades and which would also provide the maximum protection for the steel. Expert advice was obtained from paint manufacturers and a decision was made to apply a first coat of red lead primer followed by an undercoat and final coat of an alkyd resin varnish. The paint was provided by W. & J. Leigh, Ltd., Bolton, and was made to similar specification and analysis to the paint used in painting the Cunard Steamship Company's R.M.S. 'Caronia.' This magnificent ship has made many double Atlantic crossings since being put into commission. The paintwork of the ship has therefore been subjected to extremely severe conditions and it is understood that no deterioration has taken place and the metal has remained fully protected.

The Royal Fine Art Commission recommended that the dark or stronger blue should be applied up to the second gallery or about 82 ft. from ground level, the mid-blue for the next 41 ft. or between the second and third galleries, and the light blue for the remainder of the height. The contractors for the actual painting were Wm. Latimer & Co., Ltd., of Newcastle-on-Tyne. We are indebted to Mr. David Beavis, Engineer and Manager of the Edinburgh undertaking, for this note and the accompanying illustration.

NEW LONDON OFFICE CANTEEN

General view of the kitchen at the Babcock and Wilcox staff canteen.

A new canteen for the city office staff of Babcock & Wilcox, Ltd., has recently been opened in Cutler Street, Houndsditch. The canteen is fitted with mechanical extraction plant, refrigerated cold rooms, and service lifts. There are dining rooms on three floors, each with a separate still room and each planned to ensure quick and efficient service for 100 diners at one sitting.

The canteen was planned and installed by R. & A. Main, Ltd., and the well-designed kitchen, which occupies the top storey, includes the following service equipment finished in vitreous enamel and chromium plating: A central battery of four 24 in. ovens surmounted by three solid and open-type unit hotplates and pot rack. This battery is extended at one end with a bain marie (with hot closet under) and a cold water swivel arm supply. There are two batteries of two steaming compartments, three gas boiling pans, gas stock-pot stove, gas-heated roasting oven, gas griller, two-pan fish fryer, gas-heated double deck pastry oven, gas-heated boiler sets with two-gallon capacity milk and coffee urns, coffee boiler set with fountain pressure boiler, gas-heated double-tier hot cabinets and hot closets.

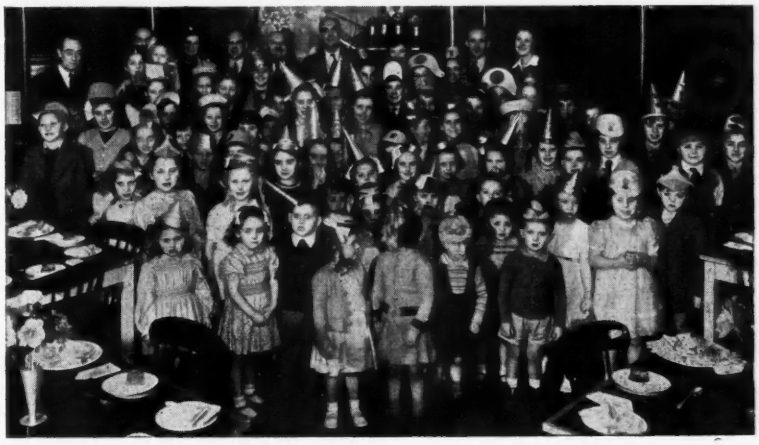
The gas services were installed by the North Thames Gas Board.

The Festive Season

Our photographs on this page indicate the spirit of Christmas. The photograph on the right is of Sir George Jessel, Bart., M.C., Chairman of Parkinson and Cowan, Ltd., and was taken at the Christmas party of the London staff of the Parkinson and Cowan Group of Companies on December 20, when the usual atmosphere of friendship and good cheer surrounded the occasion, which has a happy informality. At a dinner preceding dancing Mr. F. A. Waters, Chairman of the London Staff Club, welcomed the guests, and Sir George Jessel, in responding, said that the Group now comprised 13 companies, all of which were carrying out efficiently public service under private enterprise.

The picture on the left was taken at the first annual dinner of the Social and Recreation Club of the Coventry factory of George Wilson (Gas Meters), Ltd.

On the right is a photograph taken at the Manchester gas undertaking's first annual dinner and dance. From left to right:—Mr. R. Kerr, Deputy Accountant, North Western Gas Board; Mr. A. Henshall, Deputy Chairman, North Western Gas Board; Mr. P. Johnson, Accountant, Manchester Group; Mr. G. B. D. Farthing, Assistant Accountant, Manchester Undertaking; Mr. John Wilson, General Manager, Manchester Group; Miss J. Colclough, Miss E. Shepherd, Mr. H. G. McGregor, Mr. G. A. Taylor, Mr. W. Griffiths, Mr. F. Ford, Mr. E. Harrison, Mr. J. Pickering, Mr. H. Stephenson, Mr. H. Rothwell.



The group of children on the right was taken at the Christmas party at the Ranelagh Works of George Glover and Co., Ltd.

On the left is a photograph at a dinner given by the Chairman and Directors of Drakes, Ltd., to 117 of the staff and employees who have 20 years' or more service with the company. The number of years' service given by these employees depicted on the photograph totals 3,701 years, and the Directors are justly proud of their achievement. There were three employees with 50 years' service or more with the company, 17 with 40 to 49 years, 42 with 30 to 39 years, and 55 with 20 to 29 years' service. After dinner the Chairman of the Company, Mr. John A. Drake, presented long service savings certificates to the new qualifiers.

North Eastern Development Plans

Dr. R. S. Edwards Addresses Consultative Council

THE fourth meeting of the North Eastern Gas Consultative Council was held at Leeds on December 16. The Chairman, Mr. **W. Regan,** J.P., referred to the appointment of Councillor Mrs. **J. Smith,** J.P., as Deputy Chairman of the council. A list of gas charges in force in the various districts in the area was submitted. The list contained no new price charges, but was a codification of the prices announced by the area board last August.

Dr. **R. S. Edwards,** Chairman of the North Eastern Gas Board, reported on the general plans and organisation of the board. The first duty of the board, he said, apart from the arrangements necessary to ensure a smooth take-over on May 1, was to evolve an organisation. It was decided that as much decentralisation should be adopted as possible, and to this end it was agreed that the headquarters should be non-operational, and that six groups should be established, each under the control of a group general manager, who would carry the responsibility for the day-to-day running of the undertakings within his group.

The board, which meets monthly, is concerned with matters of policy, and does not operate functionally. The full-time members, however, undertake certain duties on behalf of the board, providing day-to-day supervision of the affairs of the board and enabling decisions to be made without delay.

The head office is organised under four chief officials (secretary, chief accountant, chief engineer, and chief commercial officer) whose function is planning and co-ordinating the activities of the board which fall within the normal sphere of their duties. They are not concerned with the detailed workings of the groups but, acting in collaboration with the group general managers, ensure the carrying out of matters of policy as laid down by the board. Operational activities which are of common interest to the whole area are performed at head office.

The board has decided not to develop hastily a close form of organisation for the groups, though fully aware it will not be possible to continue indefinitely without measures of integration. In the case of municipal undertakings, it has been necessary to make arrangements with the local authorities to continue the administrative and accountancy functions, which prior to vesting day were separated from the gas engineer and manager, until accommodation can be provided and the appropriate staff transferred.

Development Plans

Dr. Edwards said that at this stage it was not possible to give more than a short preliminary sketch of the board's plans for improving and developing the supply of gas, but reference to certain work already in hand might be made. Early enquiries after vesting day revealed that in quite a large number of places gas pressures were below statutory requirements, and in other cases were insufficient to meet peak load demands. In some instances this was due to lack of manufacturing capacity, and this state of affairs could only be remedied by the gradual bringing into operation of new plant in accordance with a programme which was subject to Government approval. Where, however, there was sufficient manufacturing capacity, steps had been taken to increase pressures by clearing old mains and installing new, &c., and considerable improvement had been effected. This work was being actively pursued, but would inevitably take some years, due to the continuing shortage of labour and certain materials. Plans were being developed to link certain undertakings, or to carry mains from larger undertakings to small ones which were inefficient. This would involve the closing down of some of the small plants. Work was also proceeding to extend and reinforce the distribution systems in a number of towns and districts in the area of the board.

The more important projects in hand, most of which were planned prior to vesting day, included the following:

Bradford.—Capacity being extended by 8½ mill. cu.ft. per day. A new coke grading and handling plant to deal with coke output by most modern technique. Gasholder capacity being increased by 2.3 mill. cu.ft.

Tingley.—A complete new gasworks designed to produce ultimately 14 mill. cu.ft. per day. The first unit will be of 7 mill. cu.ft. per day capacity. Gas will be delivered into the existing grid system to improve the supply in the southern part of the board's area.

Glass Houghton.—An installation of carburetted water gas plants of total effective capacity of 4 mill. cu.ft. per day is nearing completion. This gas will also be delivered into the existing grid system, and will further improve the supply.

Leeds.—A 5 mill. cu.ft. per day plant, to replace obsolete retorts and to increase supply. A 2½ mill. cu.ft. per day carburetted water gas unit is also being installed.

Huddersfield.—A new retort house of 3 mill. cu.ft. per day is almost complete.

It was the policy of the board that consumers should be encouraged to pay their accounts at the showrooms and alterations and adaptations were being made, particularly in the areas previously controlled by local authorities, to provide these facilities simultaneously with the take-over from the local authorities of that part of the work of the gas undertaking which came under the supervision of the borough treasurer. In addition, enquiries were being made with a view to the acquisition of further showrooms.

The **Chairman** complimented Dr. Edwards, Mr. Currier, and the board on the work they had done and the progress they had made. On behalf of the consultative council Mr. Regan said he would like to place on record their appreciation for the courtesy which they received from members of the board at all times.

New Idler Roller Works

The demand for their belt conveyor idler rollers is so great that Mavor & Coulson, Ltd., have equipped a new works solely for making them. Special M & C machines and methods embody highly efficient techniques and reduce production times. The new factory is at Farme Cross, Rutherglen, near the parent works in Glasgow, and covers an area of 64,000 sq. ft. From the office frontage and extensive forecourt, wide concrete roads run along both sides of the factory, making one-way traffic possible.

The building consists of a single storey with a glass and asbestos roof in two wide bays, giving a clear floor area unobstructed by columns. The glass gives very good natural lighting, and the asbestos parts are lined with insulating material to prevent loss of heat. The general effect of the high roof and bright paint-work is one of airiness and spaciousness.

Main Entrance of the new M & C Idler works.

The Calor Gas Research Station

With the supply of butane in this country on the increase interest, already keen, is growing keener in the use of bottled gas. This article by G. W. Battison (Walter King, Ltd., Editor, *Gas Service*) shows what is being done in developing the application of Calor gas in this country.

THE wide acceptance of butane as a popular fuel in this country has been a revelation to early sceptics, and surely few of those who championed its cause in the mid-thirties guessed how great would be the demand for this easily transportable and efficient fuel. In the short but remarkable history of the Calor Gas (Distributing) Co., Ltd., by far the largest distributors of butane in this country, the year 1949 is likely to be regarded as something of a landmark, for it was in July of this year that the research and testing station at Addlestone, near Weybridge, was opened by Mr. Alfred Robens, Parliamentary Secretary to the Ministry of Fuel and Power. This was the culmination of years of research work—work which was not only unique in this country but, to some extent, in the world. Even in the United States, where liquid gas has been in popular use for a considerable time, it is doubtful whether the properties of the fuel and the efficiency of the appliances which use it have been subjected to such careful scrutiny. Certainly technical visitors from overseas are unanimous in their opinion that there is no comparable organisation of its kind in the world.

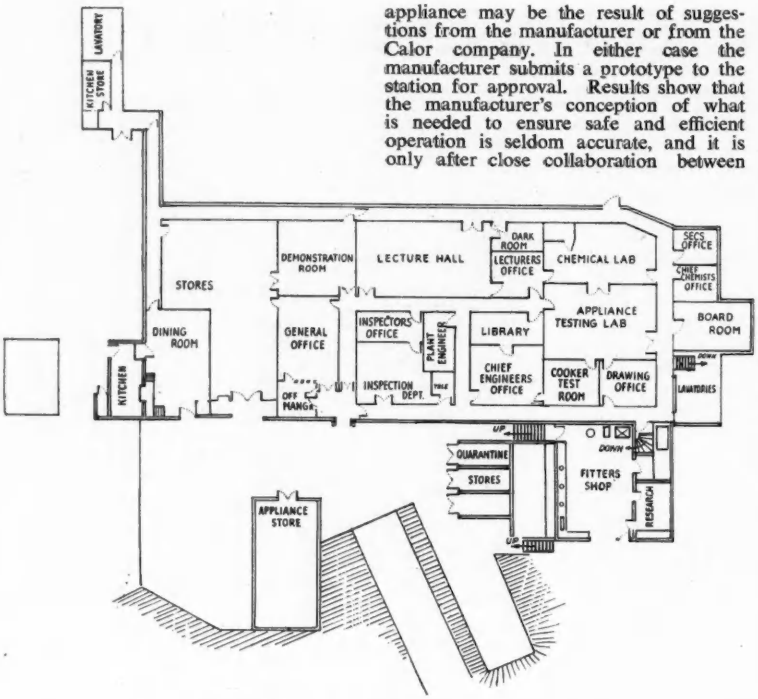
Why was it opened and what is its exact function? The answer to these questions lies in an understanding of the problems with which the Calor gas distributors have been faced, many of them requiring pioneer research work. In America manufacturers can make appliances to operate on butane to definite specified standards. No such standards exist in this country, although it is understood that a draft British Standards specification for cookers burning butane is in preparation. Moreover, in the early days there was no range of appliances for using the fuel, and such was the scepticism among manufacturers concerning the future of butane as a fuel in this country that none were prepared to undertake the job. It meant starting from scratch, and it was only after the Company had achieved considerable success with appliances of its own design and make that firms expressed themselves willing to undertake the manufacture of appliances for Calor gas. And that was only the beginning of the difficulties. For although some appliances designed for use with town gas could be converted satisfactorily, the majority required most careful adaptation. Water heaters in particular demanded radical changes in construction, for with the higher calorific value of butane—seven times that of town gas—leather and the normal jointing compounds were not acceptable. The sealing of the glands was more difficult and the degree of accuracy employed in grounding the valves had to be higher. For all this research facilities were required. Moreover, the fitting of these appliances was a specialised job, differing from ordinary practice, and the training of men from all parts of the country had to be undertaken.

A class of dealers and fitters receiving instruction in the lecture room at the Addlestone Research Station.

These then were some of the factors which contributed to this new research station, a visit to which reveals how great is the care taken to ensure maximum service for the Calor gas consumer. We were fortunate in having an opportunity to study these methods recently, and can testify to their wide scope and thoroughness. It is clear that the Company is sparing no effort to provide the most modern and efficient appliances, combined with a service of a very high quality—and this, it is important to note, is not directly related to business expansion, being rather the voluntary acceptance of a responsibility to the consumer.

Perhaps the most remarkable thing about the station is the speed with which its activities have developed. Only two years ago the research facilities of the Company consisted of comparatively limited accommodation in the King's Cross Road, manned by a staff of six. The new building has been developed in three stages, with a total floor space of about 10,000 sq. ft. In charge of gas engineering and associated matters is the Chief Engineer, Mr. T. H. Taylor, whose roots go back to the rich training ground of Watson House, while chemical development is controlled by the Chief Chemist, Mr. K. R. Garrett. The purpose of the station is threefold: Primarily, it is a centre for research, development, and testing; secondly, it functions as a training centre; and, thirdly, it embodies extensive storage facilities. The building is roughly rectangular in shape, single-storied, and compactly designed.

There is a chemical laboratory which is equipped to examine and carry out analyses on hydrocarbon gases, flue gases, jointing compounds, greases, all kinds of tubing, paints, and metallic surface finishes, &c. Chemical tests are carried out on the gas distributed, to ensure that a satisfactory material reaches the customer. In addition, all kinds of materials are developed in conjunction with the manufacturers, with a view to their being used in the distribution and utilisation of Calor gas. Before examining any of the products, it has often been found necessary to develop methods of testing. By means of this research, the best available materials are used in a somewhat exacting field. Items



Plan of the Calor Research Station at Addlestone.

of interest in the laboratory include a low temperature distillation apparatus for gas separation, a calorimeter adapted to examine gases of a high calorific value, an apparatus for the determination of wall permeability of rubber tubing diaphragm material, &c., and a flame-proof chamber.

In addition to a chemical laboratory, there is an appliance testing laboratory for which a word of explanation is necessary. It has already been pointed out that no British Standards exist for appliances operating on butane. A close check on the quality and accuracy of manufacture is therefore kept by a team of inspectors whose duty it is to visit all manufacturers of Calor gas appliances and ensure that the work is being carried out according to the company's own rigid standards. Until recently appliances were purchased from the manufacturers in bulk, but today direct contact between dealer and manufacturer is possible as in the town gas industry. This only applies to ordinary domestic equipment, however; every piece of high-pressure apparatus is tested individually at Addlestone and stamped. The industrial and commercial applications of Calor gas are greater than might be imagined, many factories in semi-remote areas employing this fuel for a variety of purposes, while café sets, fish-fryers, and similar installations are quite numerous. And, incidentally, it is remarkable how many factories in areas served by a vigorous gas undertaking are nevertheless out of range of piped gas service and are served instead by Calor gas. It might be said, therefore, that 100% inspection of appliances is assured, either at the factory or the research station.

The introduction of a new make of appliance may be the result of suggestions from the manufacturer or from the Calor company. In either case the manufacturer submits a prototype to the station for approval. Results show that the manufacturer's conception of what is needed to ensure safe and efficient operation is seldom accurate, and it is only after close collaboration between the manufacturer and the Calor technicians that a satisfactory result is obtained. This then gives some idea of the work undertaken by this laboratory and its partners, the cooker test room, the inspection department and the fitters' shop, although, of course, no mention has been made of the purely experimental work carried out or of the routine examination of faulty apparatus, &c., which constitutes a major part of the department's duties.

Training is a subject which is receiving close attention at the present time and the facilities provided are excellent. The lecture room is large and well appointed, containing, in addition to the ordinary desks, &c., a representative range of appliances of all types. Adjacent is the lecturer's office and a dark room. The normal training period is one week, and it is open to Calor gas dealers or their fitters, all of whose expenses are paid by the company. Each of the 1,000 dealers in the country must have at least one staff member who has successfully passed the course, which deals with the various problems likely to be encountered in making an installation, connecting appliances, and in rendering regular service to the consumer. Men are trained at the rate of 30 per week, and the total number who have passed to date is in the region of 1,500.

Other parts of the building contain extensive stores, a very attractive dining room with a modern and convenient kitchen, and office accommodation as follows: Board room, chief engineer's office, chief chemist's office, secretaries' office, general office, manager's office, plant engineer's office, drawing office and library. The latter library serves all sections in obtaining information, circulating periodicals, translating foreign publications, and holding reference books covering a wide range of subjects.

This short article has only touched on some of the activities carried out at Addlestone. There are many others. For example, the cylinders in which the liquid gas is distributed from the filling stations make certain demands on the department, as do the fittings, connections, &c., associated with them. Again, as Calor gas is widely used in boats and caravans, which seldom have ideal kitchen conditions, the company has long conducted a campaign aimed at better ventilation and perhaps standard installation facilities in those craft or vehicles which are sold with a Calor gas service. This is another problem upon which work is proceeding.

What of the future? It would appear that the demand for liquid gas is very considerable, although for the Calor Gas (Distributing) Co., Ltd., future expansion is governed by the company's determination not to take on more business than is compatible with the high standard of service to the consumer—particularly guaranteed supply—which has obtained in the past. When it is realised that wherever electricity costs more than 1d. per unit, Calor gas is competitive, it will be appreciated that the scope is wide indeed—and electricity is not getting cheaper. With the gas industry the butane industry is not concerned; there is room for both. But before leaving the subject of the fine new research station at Addlestone, which is likely to be kept busy in the future, it is worth noting that the price of Calor gas, at roughly twice that of town gas, has increased only 5% since its introduction in 1934.

An Ascot Visit

The London and Southern Junior Gas Association renewed acquaintance with an old friend when some 80 members visited the Neasden works of Ascot Gas Water Heaters, Ltd., on December 14. Among the abundance of processes and operations that lead up to the finished appliance perhaps the most attractive was the machine shop where automatic lathes were seen making union nuts, nipples, bends, venturis, and connectors, with no assistance from the mechanic. The visitors also expressed great interest in the testing department where the gas flow, pressure, and water temperature are visually indicated for the convenience of the operator. At the conclusion of the tour some of the latest types of appliances were seen and demonstrated, including the 708 balanced flue heater, the new instantaneous sink heater, and a prototype storage heater. Following the tour of the works the visitors were entertained to tea in the main canteen where they were welcomed on behalf of the Company by Mr. George Behr, to whose speech Mr. T. V. Garrud, Senior Vice-President of the Association, responded.

Stanley (Durham) Urban District Council has drawn the attention of the Northern Gas Board to the poor gas pressure in the Craghead area.

Gas in the Western Hemisphere*

By G. H. ROSAM,
Overseas Manager, Ascot Gas Water Heaters, Ltd.

THE domestic consumer in the Western Hemisphere is predominantly gas-minded. The reasons are many and complicated, but the most important is that, on balance, gas succeeds where so many other fuels fail. By and large, solid fuels are rather expensive and hard to come by. The whole of Latin America is almost entirely dependent upon imported coal. This in turn makes the generation of electricity expensive.

Fuels such as kerosene and vaporising oils, in addition to being unpleasant for domestic purposes, are not so cheap compared with liquefied gas, for instance, that they can hold a strong position for domestic applications in communities where domestic standards are continually rising This is especially true of large parts of South America where the bulk of oil derivatives have to be imported.

The greater number of Canadian consumers are supplied with manufactured gas and the principal districts of supply are in and around Montreal, Toronto, and Vancouver. Local coal supplies are considerable. At one time there were substantial supplies of natural gas in the Toronto area, but the reserves have been diminishing for years and are no longer of significant proportions.

Natural gas in large quantities has been available in the Province of Alberta for many years but, with the discovery of new oilfields in the Turner Valley and the Leduc areas, the natural gas potential has become immense, so that the Dominion Government is now seriously contemplating piping the gas not only across the Rocky Mountains to British Columbia, but also across the State Line into the Northern States of the U.S.A.

Until recently L.P. gas distribution has been on a small scale but inevitably, with increased oil production in Alberta, much larger quantities of L.P. gas will become available at low prices, which will encourage the use of this fuel both domestically and industrially.

Mexico has no manufactured gas supply and relies entirely on natural gas, which is piped across the Mexican border from Texas, to the industrial district of Monterey in Northern Mexico, and upon L.P. gas, which is the only gas supply in Mexico City. Elsewhere, outside these two centres, the only gas supply is L.P.

From the Southern Mexico border through Guatemala, Honduras, Nicaragua, Costa Rica, and Panama, where this State joins South America proper, the gas industry is insignificant. The area is small and the places where urban life is of a European standard are few and far between.

The gas situation is better—but not significantly so—in the Caribbean, which is that string of islands which stretch in a semi-circle from the Southern tip of Florida to the north coast of Venezuela.

In Kingston, Jamaica, there is the British-owned and operated manufactured gas organisation, and there is an L.P. gas distribution throughout Jamaica.

Associated companies of the Standard Oil organisation of New Jersey are at the beginning of a development campaign for L.P. gas in Cuba, Haiti, and San Domingo—which brings us to South America proper.

Venezuela is an oil-producing territory of great importance, holding about third position in world production. The country, however, is not highly developed, and only a minute proportion of the total population enjoys a reasonable standard of life.

Although L.P. gas and natural gas are available, there is no recorded use of natural gas for domestic purposes as yet. L.P. gas for domestic purposes, however, is already organised by one of the leading oil companies.

Like Venezuela, Colombia has no manufactured gas supply: it has, however, considerable oil resources, and an American organisation has already commenced distribution of L.P. gas for domestic purposes. However, this is still on a comparatively small scale.

In Ecuador and Bolivia the gas industries are virtually non-existent.

Peru is in somewhat the same state of development as Colombia—that is, no manufactured gas supply; distribution of L.P. gas is just commencing.

Brazil is the largest and one of the most advanced of the South American countries, and the urban areas of the southern part of the country are becoming increasingly peopled with Europeans. There are three manufactured gas utilities, operated and managed by a British-owned organisation. The concentration of the urban areas, coupled with problems of capital investment, sets a limit to the possible reticulation of piped gas and, in consequence, the L.P. gas business has expanded immensely. It is probable that there are now nearly as many consumers of L.P. gas as of manufactured gas.

Uruguay conforms once again to the more advanced South American pattern. The territory is much smaller than Brazil, but the largest communities enjoying a reasonable standard of life are all concentrated round the capital—Montevideo. Montevideo has a British-owned and operated gas utility. There is also the beginning of an L.P. gas distribution, organised by the State.

Argentina (next to Brazil the largest territory in South America) has the bulk of its urban population in an area of approximately 100 miles radius from Buenos Aires, the capital. Until 1939, the manufactured gas utility in Buenos Aires was British-owned and managed. Towards the end of the war, however, it was taken over by the Argentine Government and the gas industry—whatever fuel is used—is now a State monopoly. At the moment manufactured gas still predominates, but it is the intention of the Argentine Government to change over as soon as possible from manufactured to natural gas, drawing upon the local resources of natural gas. Latest reports indicate that domestic utilisation of natural gas, if not yet a fact, is very near to realisation. L.P. gas is also distributed on a large scale to domestic consumers.

Only manufactured gas is available in Chile and utilisation is not as yet on a large scale. However, a vast modern steel works is now in the process of erection and it is anticipated that a substantial surplus of manufactured gas will become available when the plan is in full operation, greatly exceeding the output of the present utility companies.

Gas Utilisation in the U.S.A.

In all there are 22¼ mill. consumers throughout the U.S.A. which shows an increase of 4% over the corresponding figures for 1947. This figure includes consumers supplied with L.P. gas by utilities. There are an additional 4,500,000 supplied with L.P. gas in cylinders by L.P. gas specialists.

Proved natural gas reserves as at this year amounted to 173.8 mill. mill. cu.ft. Compare this figure with the established reserves as at 1919 of only 16,000 mill. cu.ft.

At the present rate of consumption these reserves will provide 25/30 years of service but, taking the proved increment in reserves as at 1947, for example, the increase in gas reserves exceeds current consumption by 2½ times, and so the future of natural gas supplies in the U.S.A. is even more promising than currently available figures would indicate.

Here is a statistical presentation of some interesting facts:—

Type of gas	No. of consumers Mill.	Annual consumption of gas per consumer Therms	Cost of gas per therm
Manufactured ...	8¼	186	17d.
Natural... ...	11¾	793	5d.
Mixed	2	350	6d.
L.P.G. :			
Utilities ...	¼	500	6½d.
Other ...	4½	—	15-24d.

Gas range sales for 1948 total 2,800,000 units against 2,390,000 for 1947.

Water heater sales for 1948 were 1,450,000, against an all time record for 1947 of 1,800,000.

Central heating installations for 1948 were 300,000 units against a figure of 750,000 for 1947. The reduction in 1948 in this instance was due to temporary but strict limitations imposed by utility companies on new installations. Direct heating units for 1948 totalled 2,500,000.

These figures give some idea of the volume of sales which the gas appliance business enjoys. As a matter of interest, equivalent figures for electric cooking and water heating run at approximately 50% of the gas figures. Space heating

* From a paper to the West Riding Gas Salesmen's Circle.

by electricity is virtually unknown in the U.S.A.

To give an additional perspective to the total picture, 600,000 oil cooking stoves were sold during the same period (1948).

Full figures for 1949 are not yet available, but on published statistics for the first quarter of 1949, appliance sales for both gas and electricity are down against the corresponding period of 1948 by a figure varying from 10% to 50%, depending on the class of appliance. Although this drop may seem substantial, even bigger recessions are recorded against all appliances using other fuels, such as solid fuel, oil, and kerosene, and combination stoves; so it is evident that the gas industry is holding its own compared with other industries.

The sales promotional plan inspired by the America Gas Association, and now at its height in the U.S.A., may go a long way to restoring the total turnover for the whole year to something like the achievements of 1948.

Appliance Design and Merchandising

Statistics on the appliance industry can never be entirely complete in a country with manufacturing centres so widely dispersed as in the U.S.A., and therefore I have relied for my figures upon the statistics issued by the Gas Appliance Manufacturers' Association, which in turn are based on contributions by the majority of leading manufacturers in each field. The following are the numbers of the contributing companies in each group:—

		% of total manufacturers available
Stove makers	32	60
Water heater manufacturers	36	95
Gas boiler manufacturers...	14	100
Furnace manufacturers ...	30	75
Coversion burner manufacturers	18	65

These considerable numbers of active manufacturers, all satisfying the technical standards laid down by the A.G.A., ensure that the quality of the product is consistently maintained and that keen competition prevents any one sitting back and doing nothing for next year.

The trend of design in the American gas appliance business is for bigger, better, and safer appliances. External styling is all important; so is quality of finish and the incorporation of detailed refinements.

Because the house builder and architect give the American housewife a sensible sized kitchen, even if the rest of the house is small, she is able to go to the limit in buying the biggest and the most effective cooking range that she can afford.

In the water heating field, America diverges from the rest of the world by favouring storage heating in preference to the instantaneous method. The trend of design is for bigger capacities and higher recovery rates. This is a tendency which has been apparent over the last 10 years, but has been accelerated since the war by the growing popularity of the automatic electric washing machine, whose demands in respect of total water requirements, temperature rise, and instantaneous rate of flow, are exacting.

The present adoption of space heating by gas can be appreciated from the fact that of the 22½ mill. homes utilising a gas service, 9 mill. use the same fuel for space heating.

Gas Industry Structure in the U.S.A.

Once we consider the field of utilisation, we have to recognise in the United States a six-fold structure:—

The utility company
The distributor or dealer
The appliance manufacturer
The Gas Appliance Manufacturers' Association
The American Gas Association
The consumer.

The utility companies regard their function as being the sale of gas to consumers in increasing quantities, and with a regularly improving service. They exist to make a profit out of the sale of gas and do not look upon the sale of appliances as a legitimate means of augmenting their income. The utility knows that the active collaboration of the distributor and dealer is essential to over-all increase in appliance sales.

The distributor and dealer provide display, demonstration, and sales facilities in the heart of every community, large and small, in a manner which the utility would find it impossible to do. They are in the appliance business regardless of the fuel used. Electric, gas, or oil, they will provide what the customer needs for every domestic application. The end result is that the distributor and dealer is not tied to any particular industry, and if the gas industry lags, he is ready to turn his efforts to the competition.

The appliance manufacturer, faced with active competition from equally live and progressive competitors, must secure the active support of both of the utilities and the distributors and dealers by every reasonable and profitable means.

There is a close relationship between the Gas Appliance Manufacturers' Association and the American Gas Association, arising from the fact that a manufacturer becoming a member of G.A.M.A. automatically becomes a member of the A.G.A. for the single payment of dues. Members of G.A.M.A. serve on many A.G.A. Committees and also on the Board of Directors. This relationship is rather unusual, not only in the U.S.A., but in the rest of the world, and inevitably adds strength to the operations of every branch of the gas industry.

The consumer has access to an economical and efficient fuel source from the utility; is well catered for by a highly competitive dealer business; the manufacturer is constantly on the watch for improvements which will appeal to him; and his interests are watched by the American Gas Association. Above all, he is courted by the suppliers and appliance manufacturers in the field of electricity, oil, and solid fuel.

Brief Facts

The utilisation of natural gas and L.P. gas is on the increase, both in terms of consumers and quantity of gas. For manufactured gas, consumption is still on the increase, though the number of consumers is decreasing. Mixed gas, as a fuel, though it utilises natural gas and L.P. gas, is losing both consumers and gas load.

These distributing companies, however concerned with mixed and manufactured gas, are themselves maintaining and increasing their consumers and revenues for, when they change from their present fuel distribution, they almost invariably convert to the distribution of straight natural gas.

The available evidence points to an increasing use of natural gas in the future, particularly through change-over of manufactured gas utilities to natural gas. There is reason to believe, however, that there will be a hard core of manufactured gas production for many years to come, if only for the fact that ample supplies of suitable coal are readily available.

Although it is not conceivable that the L.P. gas business will ever attain the number of consumers of its three competitors, the increasing availability and reducing costs are enabling it to make great progress at the expense of kerosene and electricity.

One hundred and ninety-five utility companies are distributing L.P. gas to one third of a million consumers, in the main, by piping the fuel as a gas/air mixture.

The bulk of the consumers of L.P. gas —4½ mill.—are, however, supplied by independent companies, the gas being distributed in cylinders. The small 30-lb. cylinder, with which we are familiar in England, is virtually unknown in the U.S.A. One hundred-lb. cylinders are regarded as the minimum practical size, and an increasing number of consumers are installing containers large enough to hold from 6 to 12 months' supply of gas. In such instances the fuel is supplied by rates as low as 6 cents a lb., the equivalent of approximately ¼d. per therm. At these rates, space heating by L.P. gas becomes economical and one in three of all domestic consumers uses this service.

The phenomenal post-war growth of the business has resulted in a very high proportion of the gas cookers and water heaters manufactured in the U.S.A. being sold for use on L.P. gas. In 1948, 25% of all gas cookers manufactured went to the L.P. gas industry; in 1947, 20% of all the gas water heaters.

In small communities, where a piped gas service is impracticable, large central storage tanks of L.P. gas are installed and a supply to each is separately metered. The use of meters for the supply and charging of L.P. gas is increasing.

In the natural gas field, the Federal Power Commission authorised the construction of approximately 8,500 miles of new pipeline for 1949, involving an expenditure of nearly 2 mill. tons of steel, and bringing the total mileage in the U.S.A. to approximately 251,330 miles. Further applications for Federal approval are in hand for additions of 14,600 miles.

I acknowledge with very great pleasure the assistance which I have been given by the Gas Appliance Manufacturers' Association of America and the American Gas Association, to whose publications I owe much of the statistical data contained in this paper.

I would also like to express my thanks to Mr. Leigh Whitelaw, Managing Director of the Gas Appliance Manufacturers' Association and Mr. Davis DeBard, of the Stone & Webster Service Corporation of New York, for their invaluable advice and help.

Gas in France

From Our Own Correspondent

THE Editor of the *Journal des Usines à Gaz* (November issue), introducing a new system of complete gasification with pre-distillation of coal, complains that an ill-informed non-technical Press easily forgets that the objective of the gas industry is not only the production of gas but the up-grading of coal as a raw material into products of great value in the national economy including not only gas and coke, but tar, benzole, ammonia, and cyanides. These products are obtained in the normal gasworks process from standard gas-making coals. On the other hand the range of coals used in gas-making is extended considerably by the development of complete gasification processes which permits the gasification, without other loss than that of the ash, of non-coking coals, creating an outlet for existing national combustibles for which it is otherwise difficult to find a market.

One of these systems is described in detail by M. Francois Schussel, of the Ste. Le Gas Integral. The plant described has been erected and put into operation at Naples. It is a variant on the usual complete gasification plant with a retort superimposed upon a producer, but it operates with hot steam and air superheated in a separate vessel and working in two alternating stages, hot blast and gasification. Heat is recovered from the blow gases in a waste heat boiler with superheater. Two or three producer-retorts may be coupled with one superheater. The installation at Naples comprises two producer-retorts each 3 m. (say 10 ft.) in diameter with a normal daily capacity of 120,000 m.³ (4,230,000 cu.ft.), 60,000 in each producer, of gas with the gross calorific value of 3,200 calories (say 335 B.Th.U./cu.ft. saturated at 60° F.). Yields of 1,500 to 1,700 m.³/tonne (53,700 to 61,000 cu.ft./ton) are obtained. 70% of this gas is added to 30% of gas produced in standard retorts to make up the town supply. Plants of this type are under construction in other towns, among which is Rome, where three producer-retorts of the same dimensions are being installed.

It is pointed out that gas thus produced can be carburetted with oil in a manner similar to that used for water gas, but with a smaller quantity of oil owing to the higher initial C.V. of the gas, 3,200 against 2,700 calories (say 335 against 282 B.Th.U./cu.ft.).

The system has been profitably used for the generation of fuel-gas for coke ovens where low grade coals have been gasified instead of a portion of the high value coke. In an Austrian installation, illustrated by a schematic drawing, tar was recovered in electrostatic precipitaters at two points in the stream, that at the high temperature recovering water-free tar and that at the lower tar oils of considerable value. In the making of synthesis gas lignites have been gasified and the hydrocarbons and tar vapours have been passed through the high temperature zones to decompose them. Oxygen has also been used.

The series of studies by M. Biard, of the Research Department of Gaz de France, is continued with a consideration of the particular case of the loss of pressure in circulating propane through pipes of small diameter, less than 10 mm. His experiments show that in a pipe of 6 mm. diameter the standard formulas apply with appropriate values for the gas in question. If notable differences are found in practice between results observed and those calculated it is because the data are erroneous, the most common source of error being some partial obstruction or accidental reduction of diameter rather than that the diameter itself is too small.

Aluminium for Roof Covering

M. Veillon contributes a short note on the use of aluminium in industrial roof coverings. He cites a gasworks in Germany where this material has given good results since 1911. The obvious advantage is its lightness, its specific gravity being about one-third of that of copper or steel. It stands well in industrial atmospheres being covered with a pellicule of oxide which protects it, but it has been used with a bituminous coat. It can be used similarly to zinc or copper. Gutters and downspouts have been made in this metal, welded or riveted. And it appears to be of great interest for gasworks to take the place of cast-iron, particularly in light constructions.

M. A. Renauldon advocates a campaign to sell the gas poker particularly to householders and owners of blocks of flats who are now using solid fuel fired boilers or stoves for space heating. He recognises its wide adoption in Great Britain, but says its manufacture in France, interrupted during the war, should be resumed. For space heating generally he advocates mixed coke and gas; for blocks of flats or dwellings, background heating by coke during the three winter months leaving to gas the task of making up throughout the year with all its flexibility the requirements of each tenant. For other buildings he would have heating apparatus corresponding to the requirements, but generally with solid fuel, preferably coke, for the three winter months only, gas being used intermittently to take care of temperate periods. The defect of such a mixed system is that of lighting up the solid fuel appliance and it is suggested that the gas poker not only goes far to relieve the consumer of this nuisance but also educates him in the use of gas itself for central heating.

Natural Gas

A further deposit of natural gas has been found in the Juras. During borings near Lons-le-Saunier there was a violent eruption on October 12 of gas at a depth of about 300 m. The gas, with a very strong smell of sulphuretted hydrogen, invaded the town and played havoc with house fittings in brass or copper. A preliminary analysis shows that the gas is combustible, but its composition had not yet been determined. The pressure is about 35 kg./cm.² (500 lb./sq.in.) and tests suggest that the output may be of the order of 2,000m.³ (70,000 cu.ft.) per day. The town is already partly supplied with natural gas of a C.V. approximately 9,000 calories (say 940 B.Th.U./cu.ft.) from a boring some 7 km. away.

In the south-west the sales of gas in 1948 from exploitations of indigenous oil-wells reached over 163 mill. m.³ (3,850 mill. cu.ft.). M. Georges Génin contributes an article to *Chimie et Industrie* for November on the natural gas of Saint Marcet and its utilisation. Saint Marcet lies within the territory of the Regie Autonome des Petroles in the South-West of France. The attention of prospectors to the possibility of oil in this region was first attracted in 1920, but it was not until the resources of the State were brought to bear upon it that in 1938-39 the existence of pockets of combustible gas and two deposits of petroleum was established. The region is now being worked by this Government organisation, the Regie Autonome des Petroles, and two mixed companies, to which a fourth will soon be added, each operating over a defined area.

The gas collected at Saint Marcet has the following composition after recovery of liquid constituents, methane 92%, ethane 3.8%, propane 1.0%, butane 0.2%, nitrogen 3%. During 1947 the monthly output after treatment was 730 tonnes, of which one-fifth was butane-propane and four-fifths ordinary and special spirits. The gas is now being distributed through pipelines. Used for domestic purposes, its calorific value, 9,000 calories, is too high and needs the addition of a diluent, while that of an odoriser is also necessary. Several methods are in use to transform natural gas and in particular to lower its calorific value. The most obvious is to use it as an enricher, which is the procedure at Toulouse, where it is mixed with coal gas or water gas. It can be transformed into a mixture of hydrogen and carbon monoxide which is then enriched with the non-treated gas, thus obtaining any desired C.V. within the range from that of the non-treated and the cracked gases. The cracking is done with steam in the presence of a catalyst, the progress adopted for the treatment of the Saint Marcet gases by the gas undertaking of Bordeaux. The quantities of gas sold from this source to some 10 or 12 towns on the line Toulouse-Bordeaux reached 40 mill. m.³ (1,400 mill. cu.ft.) in 1947, representing a saving of 120,000 tonnes of coal, valued at 2,160,000 dollars.

Motor Fuel

Natural gas has been used in many industries in the region, but its use, compressed, as a motor fuel has struck the public imagination most. This application developed rapidly from 1942 and today more than 8,000 vehicles are running on this fuel, most of them heavy vehicles which can take up to six

cylinders giving a radius of running of 300 km. (190 miles). The total dollar saving represented by the use of this indigenous fuel supply amounts to liquid products 590,000, town gas 2,150,000, industrial gas 2,124,000, motor fuel 2,100,000, a total of 6,964,000 dollars which would otherwise be spent in the purchase of imported coal and petrol. This figure only as yet represents 2% of France's total importation of crude petroleum, but already attains 18% of her importation from the United States. When the output of Saint Marcet is fully developed it should save 17 mill. dollars per annum.

What seems to interest M. Génin more than anything is the possible use of these supplies of natural gas in the manufacture of synthetic rubber. France is still suffering from a lack of rubber and she does not know what the future has in store for her with regard to her plantations in the Far East. 'The creation on our own soil of a synthetic rubber industry and in parallel one of carbon black, for one cannot make good tyres without a good carbon black, would be facilitated by the exploitation of our resources in natural gas, an exploitation perhaps much more useful to France than the simple utilisation of these products as fuel.'

Atomic Energy

Mr. Robert S. Aries, of the Polytechnic Institute, Brooklyn, N.Y., examines, in the same journal, the possibilities of atomic energy in the chemical industries of France, particularly in view of her comparative poverty in indigenous combustibles. France has always been an importer of coal. The introduction and development of a nuclear source of energy might appreciably modify her fundamental economic weakness in this respect. For example, it would no longer be necessary for chemical plant to be sited in the neighbourhood of the coal mines or of the ports of arrival of foreign coal. France would no longer be dependent upon the vicissitudes of international trade in cast iron and the marketing of her precious deposits of iron ore. The consequences might very well be greater than can be imagined at present.

So far the evolution of nuclear physics has been only of scientific interest. We are now entering upon a new phase. If it is to lead to the utilisation of atomic energy on the grand scale something more will be required than the work of scientists skilled in atomic research. It will be necessary for metallurgists, chemical, electrical, and mechanical engineers and, above all, technicians, to collaborate and unite their efforts. The artificial barriers between research worker and engineer must be broken down.

Mr. Aries poses a number of questions, to which as yet he finds only partial and imperfect answers. What will be the atomic factory of tomorrow? There is no definite reply, but four or five proposals are awaiting trial. At the base of all these proposals is the question of materials which must conform to extremely severe conditions. In what length of time may we expect to be able to make practical use of nuclear energy? This question cannot be answered today or tomorrow. The necessity to surround the atomic apparatus with protection several feet in thickness appears to rule out mobile units. For large stationary units, however, the problem is different. Atomic reacters proper are esentially heat interchangers and may be very small—a feature very attractive to large plants. But dare we install atomic generators in thickly populated regions? What will be the effect of the dangerous radio-active residues? Today these plants are set up in isolated regions; nevertheless, with the development of reacters with a closed cycle, totally enclosed, it should be possible to prevent dangerous emanations. Can the employment of atomic energy be justified economically? Current projects imply a capital investment much greater than existing plant for the production of energy. The cost of fuel in the production of electricity in the U.S.A. represents only 10% to 25% of the selling price. If the cost of fuel were reduced to zero by the substitution of nuclear energy the cost of electricity would not be sensibly reduced. But in countries like France, where the cost of coal is much greater than it is in the U.S.A., the result might be different.

The article proceeds to an examination in detail of the possible price of atomic energy and that of electricity generated by it, comparing these with the price of energy from other sources. It is possible that the continually increasing price of coal and the geographically limited sources of hydraulic power may put nuclear energy 'in the running.' While, however, the development of atomic energy may enter the domain of realisation it would be an exaggeration to think that its results will be such as to revolutionise the world distribution of industrial centres. It is more likely that it will assist in the future development of French industry, which has always suffered from the high price of fuel. 'The industrialist with the short view will not probably be preoccupied with the consequences of atomic energy, since this is not yet really at his disposal, but the vigilant leader of industry will be amply repaid if he directs his reflections to the possible effects of a development which may—and sooner than we think—enter into the realm of reality.'

CALENDARS AND DIARIES

We cordially appreciate the seasonable greetings which have accompanied the following calendars and diaries and take the earliest opportunity in the New Year of reciprocating the kind wishes expressed:

Albright and Wilson, Ltd., wall calendar featuring coloured print of St. Martin's in the Fields; British Vacuum Cleaner and Engineering Co., Ltd., pocket diary and Surrey scene wall calendar; Drakes, Ltd., Halifax, refill for pocket diary; Mavor and Coulson, Ltd., wall calendar showing view of Culliford, Isle of Luing; South London Advertiser, wall calendar; Standard Furnace and Setting Co., Ltd., pocket diary with business man's section and series of coloured maps; John G. Stein and Co., Ltd., pocket diary with information on refractories; Stewarts and Lloyds, Ltd., semi-perpetual desk calendar with monthly change cards; Hugh Wood and Co., Ltd., wall calendar with richly coloured print of plant on each monthly tear-off; Dunlop and Ranken, Ltd., Marco Convevor and Engineering Co., Ltd., and Westwood and Wrights, Ltd., wall calendars.

EFFLUENT DISPOSAL

A member of the Institute of Sewage Purification wrote us a note on Mr. Badger's paper to the Institution of Gas Engineers, Comm. No. 360. He says that while from the sewage works manager's point of view the paper makes no significant advance on Dr. Key's admirable book the summary of Key's work is accurate. The new points in the paper appear to be, (1) information about the results of the Hinckley experiments and (2) the section on dephenolation. The sentences he particularly underlined are (p. 22): 'The work of the last 20 years has established that the best method of purification, at present, is to discharge from the gasworks as good a liquor as is reasonably possible into the sewers, so that the final purification is one of biochemical oxidation at the sewage works.' (P. 23): 'The amount of spent or crude liquor that can be tolerated in a particular case will. . . . depend on the quantity of the liquor and the capacity of the sewage works.'

Here he remarked that the experiment carried out at Leamington was with lightly loaded filters. The tendency today is to increase the load by different modifications of recirculation processes. It is obvious that a sewage disposal plant working near the plant of its purification capacity will be less able to cope with an additional load than a lightly loaded plant.

On the subject of the charge to be made by the sewage authority for the treatment of liquor, noting the somewhat disappointing effect of the electrostatic precipitator, our correspondent suggests that the best system of payment would be an elastic one depending on the circumstances prevailing at each sewage works. It might be based on the cost of additional plant which might be necessary immediately or in the future to cope with the gas liquor load. Incidentally, the river side of the sewage plant should receive consideration.

Other points which struck our correspondent were (p. 15) the danger of judging the quality of a liquor purely by its oxygen absorption value and (p. 24) the care that should be taken (as so well shown at Hinckley) to keep the thiocyanate and polydric phenols as low as possible in the discharge to the sewers.

It will be interesting to note what other opinions emerge in the joint discussion of this paper at Birmingham on January 19. In the meantime, our correspondent concludes, it is clear that in spite of all the work done by the Liquor Effluent Committee and other workers there is much to be done particularly in long term experiments on full scale plants. In this connection* Clifford's results at West Bromwich must be regarded as very encouraging.

* *Gas Journal*, November 30, 1949, p. 539.

CARBURETTED WATER GAS*

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***EDITOR'S NOTE*:—The author seeks to substantiate the claim that the increased use of carburetted water gas plant can be justified on the grounds of cost, control of the coke market, reliability, and flexibility, especially in meeting demands for peak load gas. He discusses the use of carburetted water gas units as base load plant.**

IT is some years since the subject of carburetted water gas was embodied in a paper presented to this Association; in fact we have to turn back to April, 1936, to consult a comprehensive paper, 'The Maintenance and Operation of Carburetted Water Gas Machines,' given by Mr. F. J. Bengough.

At that time carburetted water gas plant was used largely as a peak load plant, and in this capacity it provided, in Birmingham for example, some 7% of the total gas made. In 1936 the minimum available coal gas in summer was 220 mill. cu.ft. per week and the maximum 350 mill. in winter, whereas to-day the figures are 300 mill. and 500 mill. respectively. The ratio between maximum and minimum remains substantially the same. In the case of carburetted water gas the available capacities based on working six days a week are minimum 85 and maximum 110 mill. cu.ft. per week in 1936, and now 105 and 157 mill. respectively. Today, carburetted water gas plant is called upon to a much greater extent than pre-war in order to meet output. Thus the requirement of a normal winter week has risen from a maximum of 37 mill. cu.ft. out of a possible 100 mill. cu.ft. per week, to a maximum expected to be 90 mill. out of a possible 157 mill. cu.ft. per week. In 1935-36, the peak use of carburetted water gas amounted to 65 mill. cu.ft. per week, while this winter the peak use may be as much as 150 mill. cu.ft., since already we have had to provide 100 mill. cu.ft. in order to meet output, at a time when the maximum possible was 120 mill. cu.ft. in the week, certain units of carburetted water gas plant being still under repair.

The use of carburetted water gas has increased steadily since 1929, and more rapidly than the use of coal gas.

That this relatively large increase in the production of carburetted water gas is not confined to Birmingham is evident from the United Kingdom Gas Statistics for 1947, recently issued by the Ministry of Fuel and Power, from which the following figures are taken:

Year	Coal carbonised 1,000 ton	Oil for carburetting 1,000 gal.	Gas from carbonisation of coal mill. cu.ft.	Water gas in separate generators mill. cu.ft.
1929	17,887	58,083	254,798	46,349
1939	18,681	34,033	276,610	27,110
1946	21,824	131,673	319,549	79,061
1947	21,840	170,604	322,863	84,463

Whereas during the 18-year period, coal gas production has increased by 27%, the increase in water gas is 83%.

Increase in the Use of C.W.G.

It is interesting to seek reasons for this increase in the use of carburetted water gas. These include:—

1. *Necessity.* During and since the late war when new plant was very difficult to obtain, the load factor on carburetted water gas plants was inevitably increased to the extent of making some units into base load plants during the winter months. Use of peak load plant for base load purposes beyond a certain point implies, of course, that there may then be inadequate cover to meet peak gas outputs.

2. *Cost.* In the past carburetted water gas has been looked upon as expensive when compared with coal gas. This is not immediately apparent when cost figures for past years are reviewed, but it must be remembered that methods of costing carburetted water gas have been modified from time to time. In particular the rate at which coke has been charged to the carburetted water gas process has been very varied with respect to the average return from coke sold elsewhere. In the table below, therefore, the costs quoted for carburetted water gas have been modified on the basis of a coke charge in line with that charged to-day—*i.e.*, a charge bearing a definite relationship to the average price received for large coke. Furthermore, the costs shown for 1949 are those calculated in other respects on a similar basis to the costs quoted for other years (the original figures are shown in brackets).

Costs of Coal Gas and Carburetted Water Gas.

Year to Mar. 31	Coal gas d. per therm	Average cost of coal s. per ton	Average return from coke s. per ton	C.W.G. d. per therm	Average price of coke to C.W.G. s. per ton
1929	3.293	21/5.54	17/8.99	3.697 (3.524)	24/6 (20/7)
1931	3.015	20/11.33	19/11.11	3.772 (3.660)	26/3 (24/0.11)
1934	2.924	20/7.72	19/3.65	2.861 (2.778)	26/3 (24/1)
1937	2.822	21/4.80	22/0.94	3.196 (3.064	29/9 (26/4)
1939	2.906	23/10.05	25/0.25	3.451 (3.070)	32/3 (22/5)
1943	3.459	33/10.18	35/0.42	6.224 (5.579)	44/– (27/5)
1947	5.803	47/2.80	42/5.77	5.620 (4.302)	60/6 (27/9.16)
1949	6.841 (6.994)	57/4.95	53/3	6.997 (7.829)	65/3

Calculations made in Birmingham just prior to the late war indicated that with gas oil at 4.8d. per gal. (the price ruling at that time) it would not be possible to make carburetted water gas at the same price as coal gas unless the price of coke fell to 10s. per ton. The price of coke was actually in the region of 25s. per ton.

It is a remarkable fact that the cost of carburetted water gas production is very largely the cost of gas oil and coke used in its manufacture. Thus for the 12 months ended April 1, 1949, in Birmingham the cost of this gas oil and coke was 80% of the cost of carburetted water gas manufacture, and as high as 77% even if capital charges are included in the total.

The cost of gas oil is variable. It has recently been increased, and it is likely that this increase has not yet reached its limit. This, of course, will increase the cost of carburetted water gas production. On the other hand the coke market appears to be in a critical state. Sir Ernest Smith (1), speaking in Birmingham in September, 1948, stated most emphatically 'coke will be cheaper.' This fall in price is still awaited, but there are those who wonder how long it can be delayed. Should it come, the cost of production of carburetted water gas will be reduced, but, on the other hand, production cost of coal gas will increase. It is worth while, therefore, to examine the effect of variations in the price of oil and coke on the cost of production of both coal gas and carburetted water gas, in order to determine the variations arising in their relative costs. An increase of 2d. per gal. in the price of gas oil is equivalent to an increase of ¼d. per therm in the cost of production of carburetted water gas. A decrease of 5s. per ton in the price of coke means approximately ¼d. decrease in the cost of carburetted water gas production per therm, but an increase of 0.4d. per therm in the production cost of coal gas.

In considering the installation of new plant today, capital charges are of major importance Capital charges based on

* Paper to the Midland Junior Gas Association, November 29, 1949

installations of 9 mill. cu.ft. per day capacity are approximately 2¼d. per therm for coal gas and 1d. for carburetted water gas. These figures include all necessary ancillary plant with the exception of such items common to both as storage gasholders. Although production costs of carburetted water gas are at present approximately ¼d. per therm dearer than those for coal gas, if capital charges are included at present-day rates, carburetted water gas becomes the cheaper by approximately ¼d. per therm.

3. *Surplus Coke.* More recently carburetted water gas plants have been used in greater measure in efforts to reduce the quantity of coke available for sale. This process of substitution of carburetted water gas and other gases for coal gas has been proceeding in America for some years (since in some cases carbon is cheaper as oil than as coke), so that now water gas represents over 50% of all manufactured gas. The fact that the production of coke from coal gas in the U.S.A. decreased by 20% in 1948 as compared with 1947 (2), indicates that the steady decline in the manufacture of retort coke in recent years is by no means arrested.

In this country deliberate increased use of carburetted water gas to limit coke for sale has not as yet been too pronounced, as in general only large coke—*i.e.*, above 2 in. size—has been used in its manufacture, and such coke has in any case been easier to sell than the smaller sizes. It may, however, be possible, within the capacity of the available plant, to replace some coal gas by making extra carburetted water gas, thus limiting the coke for sale directly by producing less at source. For example, this summer in Birmingham, aided by warm weather, we were able during a three months period to reduce coke for sale by this method by an average of 1,250 tons per week, or approximately 11.5%.

Use of smaller fuel than normal for carburetted water gas production inevitably leads to a reduction in the volumetric output of the plant, the magnitude of this reduction depending on the size of fuel used. During a recent test using 1 in. nuts (graded ⅞ in.-1¼ in.) instead of the usual fuel of above 2 in. in size, it was found that the volumetric output was reduced by practically 20%. When using smaller fuel in order to pass the requisite volume of air through the fire without excessive back pressure, it is necessary to reduce the depth of the fire—*e.g.*, in the above case by 6 in. or 8 in. This limits the reduction that can be allowed in the size of fuel used in a set designed to work on large coke since the point might be reached at which the necessary reduction in the depth of the fire would lead to channelling, producing an uneven fire, isolated tubes of heavy clinker, and generally erratic results. If such a reduction is made in the depth of the fire the length of the back run would probably have to be reduced in order to avoid overheating the grate.

It must be admitted that water gas sets at present in use are not suitable for dealing with the smaller grades of coke, though it may be asked on the other hand why sets should not be specially designed to use such fuel. Such sets, if of normal dimensions, would be of smaller capacity of course, but there is a real difficulty concerning blast rate, since if this is made adequate for small fuel the point is reached at which fuel is blown over from the generator into the carburettor. We may perhaps agree, therefore, with Mr. J. T. Haynes (3) that 'as the gas industry must remain a two-fuel industry for many years to come, it is to be hoped that as a result of improved coke marketing in the future water gas plants will be used mainly to meet gas loads and not to use up stocks of coke.'

4. *Modifications in Operation and Design.* There can be no doubt that it has been possible to extend the use of carburetted water gas plant largely because of the attention that has been paid by official bodies like the Institution of Gas Engineers and the Gas Research Board, and by both manufacturers and operators of plant, to the possibility of improving the efficiency of the carburetted water gas process. As a result a good deal is known of the mechanism of the reactions involved, and of the conditions necessary to ensure high efficiency (4), (5). It is interesting to note that a projected investigation into the use of preheated blast and preheated steam has recently been reported (6).

Perhaps some of the modifications that have been made have yet to be proved, but I hope that the mention of just a few of them will provide food for thought, and help to stimulate discussion.

(i) *High Pressure Steam.* Methods for improving the thermal efficiency of water gas production have recently been reviewed by Mr. L. J. Clark (7). The generation of steam from waste heat at higher pressures, and the use of steam to generate electricity in pass-out machines, have enabled modern water gas sets to be truly self-supporting in steam and power. In the case of these sets the necessary air blower, exhauster and pumps are electrically driven.

(ii) *Oil Power.* The use of hydraulic oil power for the automatic operation of carburetted water gas sets appears to offer a very neat arrangement for the control of plant valve movement, interlocking, and emergency shut-down. The system, in use at Sydenham, has been fully described by Mr. S. C. Herbert (8).

On the other hand, improvements have been made in the arrangement of the water hydraulic system. In particular the use of outside packed operating cylinders has enabled maintenance to be carried out if necessary with the plant at work.

Oil power is also used in the hydraulic drive to the rotary grate. In the Lockheed system a small electrically driven pump supplies oil under pressure to operate a piston, which in turn actuates the pressure plate which moves the grate. Advantages of the system include a very simple control of a wide degree of speed variation, and incorporation of a safety device whereby pressure developed in moving the grate can be controlled to a safe limit. There is a disadvantage as compared with the electric drive in that the grate cannot be reversed, but no doubt in time the ingenuity of manufacturers will be applied to overcoming this difficulty.

(iii) *The Checkerless Carburettor.* In Birmingham the carburettors are fitted with checker bricks, but elsewhere there are those who favour the checkerless carburettor. Absence of checkers means a lower velocity for the gas and therefore greater time contact at elevated temperature of oil vapour and blue water gas. The checkerless carburettor is essential if oil of high free carbon content is to be vaporised and cracked. Sets are now in use in this country having the checkerless carburettor built in an elevated position with respect to the generator, so that the generator-carburettor main falls slightly towards the carburettor, and is attached near to the base of this vessel. Thus gases normally flow upwards in the carburettor and there is a temperature gradient falling from bottom to top of the vessel. The oil which is sprayed in from the top travels counter-current to the flow of gases, and descends into zones of progressively increasing temperature. This arrangement, it is claimed, results in high oil gas efficiency. It is interesting to notice that an eminent American authority considers on the contrary that the accepted ideal occurs when 'oil is introduced into a relatively high temperature zone, and then flows through a zone of progressively decreasing temperature' (9).

In favour of the checkered carburettor it is claimed that the checkers provide for the uniform storage of heat over the cross-section of the vessel, whereas with the smaller amount of brickwork in the checkerless carburettor, there may be a tendency for the vessel to become overheated during the blow, resulting in over-cracking at the commencement of oiling, while owing to the lower thermal capacity of the vessel oiling produces more rapid cooling, so that under-cracking may occur before the end of the oiling period. Furthermore, absence of checkers implies a greater volumetric capacity for the carburettor which may mean higher gas loss in purging.

(iv) *Conditions for Operators.* Although the conditions for operators of water gas sets are generally quite good, an unpleasant atmosphere on the operating stage does result when stack gases are blown across the building under adverse weather conditions. This problem has been mastered in

recent years by taking the stack valve outside the building, to a height above roof level of approximately 8 ft. It is likely that in future few new sets will be fitted with stack valves enclosed under the roof.

Perhaps the worst job associated with the manufacture of carburetted water gas is the cleaning of the washer, especially if the vessel is of the type that has to be entered for cleaning. The newer type of washer is raised above floor level, has a convex or sloping bottom and side cleaning holes close to its base, so that accumulations of tarry dust can be successfully removed by working from outside the washer.

5. *Reliability.* The modern carburetted water gas plant is a very reliable unit. Breakdowns causing interruption of gas-making for more than a few minutes are comparatively rare. This reliability reflects the interest taken by those closely connected with plant operation and by maintenance and repair teams. In Birmingham several minor modifications have resulted, and I would draw attention to the following:—

(i) Trouble has been experienced from time to time with the working steam valve, arising from inadequate lubrication. This causes the valve to work erratically and often to fail to shut completely, such failure resulting on an automatic plant in interruption of the cycle and shut down of the set. In order to overcome the difficulty the hand-operated lubricator originally fitted to oil the steam valve was replaced by a mechanical lubricator, arranged for automatic operation by impulse from the operating lever of the working oil valve. There is thus one stroke of the lubricator every time the oil valve opens—*i.e.*, once every cycle and while the steam valve is open. Since the automatic lubricator was fitted the steam valve has worked for two years without giving any trouble.

(ii) The valve spindle of the back-run valve was another short-lived item of the water gas plant. A spindle would never remain in good condition for a 10 month period of intermittent work, owing to the corrosive character of back-run gases. A simple home-made lubricator was arranged to feed small quantities of oil regularly on to this spindle. The valve of the lubricator is automatically opened whenever the back-run valve opens, and shuts under its own weight at the end of the back-run. Each time the valve is open four or five spots of oil drip from the small orifice on to the valve spindle. The effect of this regular lubrication has been most remarkable, not only in respect of the valve spindle, which is scarcely worn after 10 months' work, but also as far as the interior of the valve itself is concerned. The back-run valve is normally subject to severe conditions and is usually very dirty and corroded when it is examined at the annual overhaul. The valve which had received this regular controlled oiling was only slightly corroded, and in fact was largely highly polished inside.

(iii) Another point of failure was on hydraulic operating rams for the working valves at the level of the top of the packing gland, at which position coke dust is liable to collect and produce excessive wear. This weakness has been conquered by having the rams treated by an electrochemical deposition process whereby the rams are given a skin of chromium just a few thousandths of an inch thick. The process was first used to build up and salvage badly worn rams, but now new rams are treated by this process before use, since we have found that rams having this skin of chromium resist the abrasive action of coke dust, and the corrosive action of air and sulphur-laden water, very well. The life of such rams is very much greater, and the time and material spent on packing glands very much reduced, as compared with the original mild steel rams.

(iv) In Birmingham our programmes involve each carburetted water gas set being actually gas-making for some 4,000 to 5,000 hours each year—*i.e.*, approximately 50% load factor. In order to maintain good cracking efficiency it is necessary to re-checker the carburettor of each set at its annual overhaul. In the case of the superheater, however, the larger amount of checker brickwork may remain in good condition for several years. Unfortunately, the firebrick pedestals which support the checkers frequently spall and disintegrate after a very much shorter period, so that it has been necessary to remove checkers from the superheater (a process which involves a good deal of breakage) in order to replace the faulty supporting pedestals. To overcome this difficulty a series of refractory arches supported from the side walls were used instead of the pedestals. As purpose-made blocks were not available, the arches were cast in refractory concrete, consisting of five parts grog of recovered good-quality firebrick, and one part of cement fondu. These arches are still quite good after two years' service, so that this year we have extended the experiment, using similar arches of purpose-made blocks on both carburettor and superheater. The use of such supporting arches is attractive from the point of view of reducing back pressure in the sets, a point which becomes of importance if modifications are to be made to increase set capacity.

The back-run lubricator referred to above was introduced by Mr. J. Newell, the maintenance charge hand at our Windsor Street works, and the refractory arches by Mr. F. Hughes, the foreman retort setter at our Nechells works, who is in charge of repairs to refractories on the water gas plant.

6. *Flexibility.* The year has been remarkable for the attention that has been directed to the subject of peak loads. At the meetings this summer of the Institution of Gas Engineers and of the International Gas Union much time was given to consideration of this subject and the problems which peak loads pose (10). While many differing views of the solution of peak load problems have been expressed, there is general agreement on two facts:—

1. Atmospheric temperature is the major factor in producing peak daily demands.
2. In all considerations of the solution of peak load problems, the question of cost is predominant.

In connection with the temperature effect it is important to remember that it is the variation from the normal for the time of year which is important, so that embarrassment arising from peak outputs is just as likely to arise in March and April, or in September and October—*i.e.*, at the beginning and near the end of the annual repair programme—as during the colder months January and February. It can surely be little comfort to us in this respect that atmospheric temperatures in this country are so unpredictable.

If peak loads can be an embarrassment to us in the gas industry, they can prove disastrous for our friends on the electricity supply side. Sir Claude Gibb has pointed out that a 1 kW domestic electric radiator costing, say, £1 to purchase and install, costs the nation £100 to supply if it is used during a peak load period (11).

The carburetted water gas plant is a very valuable peak load plant because of its extreme flexibility. In general in this country the flexibility of calorific value associated with the plant is known and accepted, but the plant is also flexible in other ways, and in particular it is capable of undergoing numerous small modifications, and thus being fitted to serve for a variety of different processes. Modifications have been and are being made in the construction and method of operation of carburetted water gas plant in order to increase plant output, often it must be admitted at some sacrifice of efficiency.

A simple modification enables an increase upwards of 20% to be made in the thermal output of a plant by increasing the calorific value of the gas produced up to as much as 650 B.Th.U. per cu.ft. This means using more oil for enrichment and to do this it is necessary to increase the heat available in the blow gases, so that extra heat can be stored in the carburettor and superheater. This is possible if a small quantity of blue water gas is burned in the vessels during the blow period, and can be achieved by taking a small supply of steam from the main supply through a bypass round the working steam valve. This steam line is fitted with a regulating-shut-off valve in a position readily accessible to the plant operator, and with an orifice and gauge for measuring steam flow. This small supply of steam is maintained throughout the cycle at a rate of 3 to 4 lb. per 1,000 cu.ft. of gas made, and is only

shut off when the plant is stopped for any reason. The only other important modification necessary is the fitting of an oil spray of larger capacity. This equipment provides a very effective method of helping to meet a sudden demand for extra gas, if there is available a standby source of low grade gas like producer gas or blue water gas.

Extra volumetric output can be obtained from carburetted water gas sets by using blow gases to augment the water gas made. This so-called blow-run process has been used extensively in America, and it has been used in this country, particularly during the severe winter of 1947. It is a useful means of obtaining extra output in case of necessity though it suffers from the disadvantage that it yields a gas of higher specific gravity than normal.

The reforming process is also of value as a means of increasing the volumetric output of water gas sets. Much attention has been paid in America to this process where it has been in use for some 20 years (12).

The reforming process results in the use of less coke and more oil. The greater use of the reforming process in America as compared with this country results in part from the rather different price differential between coke and oil, in the two cases. In America the reforming process has been used with refinery oil gas, natural gas, gas oil, liquefied petroleum gas, butane, &c., in general with success. The process has been used here with gas oil, and since in order to use the process extensive modifications to the water gas set are not required, subject to the existence of a favourable price for oil it might well be used to aid in meeting peak loads. Much has been written in the technical Press recently of the use by the gas industry in this country of refinery oil gas (13). This is a mixture of gases of high calorific value, and if this could not be utilised as received it would lend itself admirably to the reforming process.

The use of oil gas is naturally more common in America than over here. This subject has recently been historically reviewed (14) and the various methods used for the production of oil gas summarised. There are the many excellent papers on this subject (15).

Base Load C.W.G. Plant

The fact that capital charges for carburetted water gas plant are today considerably less than those for coal gas plant makes very attractive the prospect of using carburetted water gas units as base load plant. Supposing extensions to base load plant to the extent of 9 mill. cu.ft. per day capacity were required, this could be met by installing four units of 3 mill. cu.ft. per day capacity, thus allowing one unit off in turn for repair.

One objection to such a scheme is the higher napthalene content of carburetted water gas as compared with coal gas from continuous vertical retorts. Usually this naphthalene is deposited in the condensers, but some passes forward and is trapped in the purifiers. During hot weather in the summer this naphthalene is sublimed off into the gas stream and makes its presence felt ultimately by blocking service pipes on the district. This can be overcome, however, by inserting a small oil washer in the gas stream at inlet purifiers.

On the other hand, there are many advantages:—

1. The possibility of using accumulated stocks of coke and ultimately of matching supply with demand.

2. A saving in steel in the construction of the plant. A coal gas plant of the size envisaged would require approximately 5,000 tons, whereas the carburetted water gas plant would require less than 2,000 tons.

3. A saving in the time required for installation of the plant.

4. A saving in the ground space required.

5. A reduction in the quantity of ammoniacal liquor requiring disposal. This is an important point, now that the disposal of ammoniacal liquor is no longer a revenue producer but an embarrassing and costly business.

6. There is no doubt that installation of carburetted water gas instead of coal gas would ease the labour position which is still difficult in our industry. The water gas plant requires a smaller number of men, but calls for a higher degree of skill, whereas the coal gas plant requires a larger number of men willing to do the more arduous and dirty work in the retort house.

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ENGINE-ROOM EXPLOSION

An explosion which occurred on Christmas Day in the engine-room at the Brierfield works of the Nelson undertaking, North Western Gas Board, deprived an area containing 50,000 people of gas supplies for a period of 10 days. The distribution-house at the works was wrecked and hundreds of windows in neighbouring houses were broken. Following the explosion police cars and loudspeakers toured an area of three square miles in the districts of Nelson, Brierfield, Barrowford, Wheatley Lane, Fence, and Blacko, urging consumers to cut off their supplies at the meter to avoid the danger of an explosion in the mains. The Burnley and Colne undertakings at the same time were called on to supply gas in sufficient quantity to charge the affected mains and keep them free from danger. The cause of the explosion, in which only one man sustained a minor injury, has not yet been announced. Supplies were resumed on January 2 after gangs of workmen had worked day and night at the scene of the explosion.

An exhibition, entitled Research and Production, is to be held by the British Welding Research Association at their London headquarters, 29, Park Crescent, W.1, from February 7 to 11, between 10 a.m. and 5.30 p.m. Every aspect of welding will be covered by the exhibition, which will show how research has helped welding, and how welding can increase productivity. Demonstrations will be given of the non-destructive testing of welds and resistance welding machine instrumentation; films will be shown daily; and a number of lectures are being arranged.

PUBLICATIONS RECEIVED

The Tin Research Institute has published a booklet, *Fusible Alloys Containing Tin,* which describes the compositions and properties of the tin-containing fusible alloys and illustrates many of their more important industrial applications. These alloys have the advantage of a very low temperature melting point; metal to metal joints can be made by conventional soldering techniques at temperatures as low as 100°C., and their use in aircraft factories, foundries, and engineering shops simplifies many assembling operations. The book can be obtained, free of charge, from the Institute at Fraser Road, Greenford, Middlesex.

We have received from the Fire Protection Association four booklets, three of which are reprints of articles which have appeared in the F.P.A. Journal. The titles of the reprints are 'Building Boards in Relation to Fire Protection,' 'Fire Resistance Grading of Elements of Structure,' and 'Fire Research Organisation.' Of these the second is of interest to all who are concerned either in the maintenance of existing structures or in the erection of new buildings; it provides information on the degree of fire protection required for structural steelwork, and on fire resistance grades in walls, partitions, floors and roofs. The other booklet deals with fires involving dusts.

The Gas Council has issued two publications both of which are concerned with gas appliances. The first, *Planning for Industrial Catering,* has been produced in co-operation with the Tea Bureau, 'for the guidance of architects, equipment specialists, and caterers in providing by careful planning in advance the foundation for a perfect catering and tea service.' Specimen lay-out plans and perspective drawings are included which illustrate a variety of different needs for catering for between 50 and 1,000 people at any one time. Full specifications of the necessary equipment are provided, and the illustrations also include photographs of a number of modern factory canteen kitchens in which the latest type of gas-fired appliances have been installed. The book is an enlarged and more detailed version of the volume which was produced for the gas industry by the Tea Bureau during the war under the same title, and incorporates the many advances which have taken place in canteen and kitchen planning since that date. The diagrams and drawings leave nothing to desire in their size and clarity, but it is unfortunate that the quality and attractiveness of the photographs should have been marred by their reproduction in dull green. The book is obtainable from the Gas Council at 1, Grosvenor Place, S.W.1, price 8s. 6d. The other publication is a booklet on flues for gas appliances, which reproduces in a slightly abridged form Section 3 of *The Domestic Gas Handbook for Architects and Builders* and is illustrated by four of the diagrams from that section. It thus makes more widely available in an inexpensive form the latest recommendations on the construction, sizes, and fittings of flues, position of terminals, and the use of flue blocks. This is also available from the Gas Council, price 6s. per dozen.

Company News

The telephone number of the **British Aluminium Co., Ltd.,** at Salisbury House, London, E.C.2, is now MONarch 4422.

Power-Gas Corporation

The consolidated trading profit for the year ended September 30, including estimated profit on work in progress, is £337,918, compared with £267,221 for the previous year. Net profit, after allowing for depreciation, directors' remuneration, tax, and subsidiaries general reserves, amounts to £86,655, against £60,210 in the previous year. Payment of an Ordinary dividend at 12½% leaves a sum of £59,000 for general reserve, against £32,000 in 1948. The Chairman, Mr. Wilfred Beswick, in his statement accompanying the annual report, notes that the tonnage of material despatched from the works last year was the highest in the company's history. The directors have adopted a long-term programme of works reconstruction, having as its aim the creation of a new works on a fresh site. Negotiations for the site are being completed and preliminary work in connection with the building of a modern constructional shop, as the first stage in the programme, is already in hand.

STOKE-ON-TRENT RESULTS

The final report of the Stoke-on-Trent Gas Department for the year ended March 31 records record total sales of gas at 6,026,103,300 cu.ft., an increase of 751,623,300 cu.ft., or 14.24% over the previous year. Mr. J. E. Stanier, Chief Engineer and Manager, states in his annual report that there has been a continued increase in the sale of gas to domestic consumers and, although this only advanced 59,110,600 cu.ft. as compared with last year, it is nevertheless an increase of 3.43%. The sales of all types of appliances continued to increase, and the total business transacted increased during the year from £85,252 to £113,572. This is indicative, the report adds, that if appliances can be sold on attractive hire purchase terms there is a market for all the appliances which can be obtained from the manufacturers. The total of 3,462 cookers sold during the year showed an increase of 765 over the previous year. Commercial and industrial sales at 3,660,844,700 cu.ft. showed an increase of 19.59%. Gross profit transferred to the net revenue account was £208,900, against £134,927, and after deduction of interest and sinking fund charges net profit was £108,249, compared with £53,646 for the previous year. 'There is no doubt,' the report concludes, 'that by acquiring the undertaking the West Midlands Gas Board will be taking over a remarkably virile and a financially sound concern, having a capital value of over £2 mill. While the outstanding loan debt of the undertaking at March 31 was £1,126,840, the reserve funds amounted to £446,213, and if these are deducted from the net loan debt, the actual indebtedness of the undertaking would be reduced to £680,627.'

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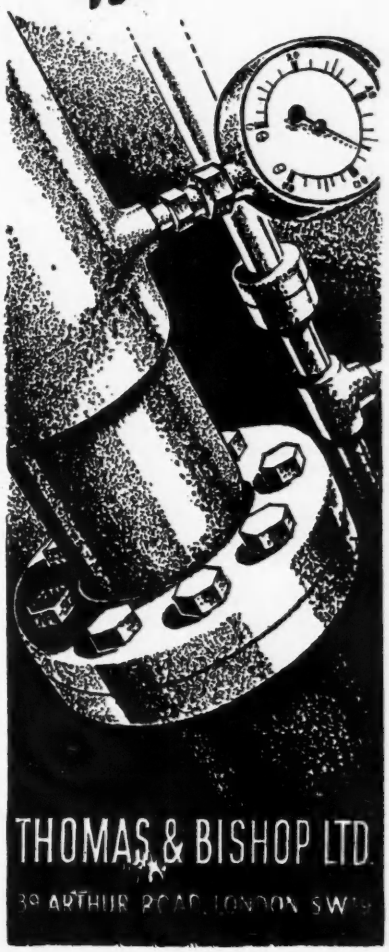

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